FIVE-YEAR REVIEW REPORT
FOR
NORWOOD PCBS SUPERFUND SITE

Norwood, Massachusetts

December 2004

Prepared by:

United States Environmental Protection Agency
Region 1
Boston, Massachusetts

With Technical Assistance from:

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Date: 12/29/04

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ABBREVIATIONS AND ACRONYMS

ARAR	Applicable or Relevant and Appropriate Requirement
AWQC	Ambient Water Quality Criteria
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
DOT	Department of Transportation
FS	Feasibility Study
GSA	General Services Administration
GZA	GZA Geo Environmental, Inc.
IRM	Interim Remedial Measure
MADEP	Massachusetts Department of Environmental Protection
MCP	Massachusetts Contingency Plan
NCP	National Contingency Plan
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PAH	Polyaromatic Hydrocarbon
PCB	Polychlorinated Biphenyl
ppm	part per million
PRP	Potentially Responsible Party
RA	Remedial Action
RBAL	Risk Based Action Level
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
Shaw	Shaw Environmental, Inc. (formerly Stone & Webster)
SVOC	Semi-Volatile Organic Compound
TAT	Technical assistance team
TBC	to be considered
TCB	Trichlorobenzene
TCE	Trichloroethylene
TSCA	Toxic Substances Control Act
USACE	U.S. Army Corps of Engineers
USEPA	United States Environmental Protection Agency
UST	Underground Storage Tank
VOC	Volatile Organic Compound
yd^3	cubic yards

EXECUTIVE SUMMARY

The United States Environmental Protection Agency, Region 1 (USEPA) has conducted a Five-Year Review of the Remedial Actions (RAs) implemented at the Norwood PCBs Superfund Site (Site) in Norwood, Massachusetts, in compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601, *et seq*. USEPA conducted this review between May 2004 and December 2004 with technical assistance from Shaw Environmental, Inc. (Shaw) under a General Services Administration (GSA) contract. This is the second Five-Year Review for the Site. The triggering action for the first Five-Year Review was the date of the start of the first RA in 1989. Subsequent reviews are conducted at least every five years. The purpose of the Five-Year Review is to evaluate whether response actions and original performance standards remain protective of human health and the environment.

The RAs at the Site have been divided into four phases consisting of: Phase 1 – groundwater treatment; Phase 2 – building demolition; Phase 3A – cap and cover; and Phase 3B – Meadow Brook restoration. On January 11, 1996, construction of the groundwater treatment facility (Phase 1) was completed. On February 6, 1997, the building demolition (Phase 2) was completed. On August 11, 1998, the Cap and Cover (Phase 3A) was completed. On August 11, 1999, Meadow Brook restoration (Phase 3B) was completed. The groundwater treatment facility operated from January 1996 until June 2000 at which time it was shut down; quarterly groundwater monitoring continued until October 2002. The clean up goals published in the 1989 Record of Decision (ROD) and 1996 Amended ROD have not been met; however, new clean up goals are being documented in the Explanation of Significant Differences (ESD) released in conjunction with this Five-Year Review. The most recent groundwater monitoring data shows that these new clean up goals are being met. Further sampling is planned to confirm that these clean up goals continue to be met.

The remedy at Norwood PCBs Superfund Site protects human health and the environment because new clean-up goals have been met, Operation & Maintenance (O&M) Plans have been submitted by the PRPs and approved for the Grant Gear Property, and institutional controls are in place. Meadow Brook O&M has been transferred to the Town of Norwood. However, in order for the remedy to be protective in the long-term, the following actions need to be taken; institutional controls for the industrial site and Meadow Brook must be updated and implemented and Operation and Maintenance at the site must be conducted regularly.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Norwood PCBs		
USEPA ID *(from WasteLAN)*: MAD980670566		
Region: 1	**State: MA**	**City/County: Norwood/Norfolk County**

SITE STATUS	
NPL status: Final	
Remediation status (choose all that apply): Operating	
Multiple OUs?* No	**Construction completion date:** September 1999
Has site been put into reuse? Yes	

REVIEW STATUS	
Lead agency: USEPA	
Author name: Sharon Hayes and Bob Cianciarulo	
Author title: Remedial Project Manager	**Author affiliation: USEPA**
Review period: 05/04 to 12/04	
Date(s) of site inspection: 5/12/04	
Type of review: x Post-SARA _ Pre-SARA _ NPL-Removal only	
Review number: 2	
Triggering action: Completion of First Five Year Review	
Triggering action date *(from WasteLAN)*: 1999	
Due date *(five years after triggering action date)*: 12/30/04	

Five-Year Review Summary Form (cont)

Issues:

1) Groundwater treatment was stopped before ROD-specified clean up goals were met; new clean-up goals are being established under an Explanation of Significant Differences (ESD) issued concurrently with this 5-year Review.
2) Additional groundwater monitoring is needed to ensure that new clean up goals are being met.
3) Updated Institutional Controls have not been recorded.
4) Monitoring of the remedy will continue as long as contamination above action levels remains on site.

Recommendations and Follow-up Actions:

1) Continue groundwater monitoring; evaluate need for future groundwater extraction and treatment.
2) Record updated Institutional Controls.
3) Continue monitoring and O&M

Protectiveness Statement:

The remedy at Norwood PCBs Superfund Site protects human health and the environment because new clean-up goals have been met, Operation & Maintenance (O&M) Plans have been submitted by the PRPs and approved for the Grant Gear Property, and institutional controls are in place. Meadow Brook O&M has been transferred to the Town of Norwood. However, in order for the remedy to be protective in the long-term, the following actions need to be taken; institutional controls for the industrial site and Meadow Brook must be updated and implemented and monitoring and Operation and Maintenance at the site must be conducted regularly.

1.0 INTRODUCTION

1.1 PURPOSE

The purpose of this Five-Year Review is to determine whether the remedy at the Norwood PCBs Superfund Site (Site) is protective of human health and the environment. In addition, this report identifies issues found during the review and recommendations to address them. The U.S. Environmental Protection Agency, Region 1 (USEPA) prepared this Five-Year Review pursuant to Section 121 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. § 9631 and the National Contingency Plan (NCP), 40 C.F.R. Part 300. CERCLA Section 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The USEPA interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead Agency shall review such action no less often than every five years after the initiation of the selected remedial action.

1.2 AUTHORITY FOR CONDUCTING THE FIVE-YEAR REVIEW

Pursuant to Section 121(c) of CERCLA, 42 U.S.C. § 9631(c), as amended, and 40 C.F.R. §300.430(f)(4)(ii) of the NCP, Five-Year Reviews are required at sites for which, upon attainment of the Record of Decision (ROD) clean up levels, there are remaining hazardous substances, pollutants, or contaminants remaining on the site that will not allow for unlimited use and unrestricted exposure. Since the ROD for this Site was signed in 1989, and because wastes remaining in the capped on-site landfill will not allow for unlimited use, future Five-Year Reviews for this Site will continue to be required.

This review reassesses Applicable or Relevant and Appropriate Requirements (ARARs) for substances identified as contaminants of concern, and considers whether ARARs have been changed such that the remedy is no longer protective. The review also considers pending or actual changes in zoning or land uses that could undermine the remedy and the need for institutional controls at and near the Site. This review has been performed in accordance with USEPA's June 2001 Comprehensive Five-Year Review Guidance.

2.0 SITE CHRONOLOGY

Major Site activities are summarized in **Table 2-1**

Table 2-1
Site Chronology

06/01/83	Initial discovery of contamination on the property
06/24/83	Initial Removal Actions begin
08/03/83	Removal Actions complete
06/10/86	Site listed on National Priorities List (NPL)
05/21/87	Remedial Investigation/Feasibility Study (RI/FS) complete
09/29/89	Record of Decision (ROD) signed
04/07/94	Remedial Design complete
11/22/94	On-site construction begins for first phase, groundwater treatment plant
01/11/96	Groundwater treatment plant construction complete (Phase 1)
03/01/96	Operation and Maintenance of treatment system begins
05/17/96	ROD Amendment Signed
02/06/97	USEPA and MADEP performed final inspection of building demolition (Phase 2)
04/97	PRP initiated Cap/Cover activities
10/97	Meadow Brook Restoration begins
08/11/98	USEPA and MADEP performed a final inspection of Cap/Cover (Phase 3A)
08/11/99	USEPA and MADEP performed a final inspection of Meadow Brook Restoration – Phase 3B
09/99	Construction Completion designation achieved
12/30/99	First 5-Year Review complete
04/00	Final Supplemental Risk Assessment submitted
06/00	Groundwater treatment system temporarily shut down
05/11/01	Groundwater Use and Value determination prepared by MADEP
05/28/02	Final Amendment to the Risk Assessment submitted
12/15/04	Final Cap & Cover Operation and Maintenance Plan approved
12/30/04	Second Five-Year Review complete

3.0 BACKGROUND

3.1 SITE DESCRIPTION

The Norwood PCBs Superfund Site (referred to as the "Site") is located in Norwood, Massachusetts approximately 14 miles southwest of the city of Boston. See Figure 1 for a Site Locus Plan and Figure 2 for a Site Plan (Figure 5 of the GZA 2003 Soil/Brook Remedial Construction Report). It encompasses approximately 20 acres consisting of several parcels of land, including industrial/commercial properties and associated parking areas in an industrial/commercial area adjacent to a residential area. To the north, the Site is bordered by residential properties on Audubon Road to the east by the heavily commercial U.S. Route 1 and the Dean Street access road, to the south by Dean Street, and to the west by residential properties on Pellana Road. Properties along U.S. Route 1 in the vicinity of the Site are primarily commercial, and include automobile dealerships, an equipment rental business, a pet shop, restaurants, and gasoline stations. A pharmacy, an auto parts store, a Direct Tire dealership, and a Mobil gasoline station are located to the southeast of the Site, near the Dean Street access road and Route 1. A shopping plaza, a car wash, and two restaurants are located across Dean Street to the south of the Site. The northern portion of the Site consists of a portion of Meadow Brook surrounded by a small wooded area. Meadow Brook is a shallow stream approximately 6 to 8 feet wide and 6 to 12 inches deep. The Brook serves as a drainage way for over 900 acres of densely developed land and discharges into the Neponset River approximately 1,600 feet downstream of the Site.

3.2 SITE HISTORY

Contamination at the Site originated from disposal practices of the parties who owned the property or operated businesses on the Site. The former on-site building was constructed in 1942 by Bendix Aviation Corporation, which produced navigational control systems and conducted other electronic research for the U.S. Navy. In October 1947, the land was purchased by Tobe Deutschman Corporation, which manufactured electrical equipment at the Site, including capacitors and transformers. The property was purchased in October 1956 by Cornell-Dubilier Electronics, Inc., which also manufactured electrical equipment at the facility. In January 1960, the property was briefly owned by Maryvale Corporation, and was then purchased by the Friedland brothers. The Friedland brothers leased the property to Federal Pacific Electric Company, which held the lease on the property until October 1979. During the period from 1960 to 1979, Federal Pacific Electric Company operated a business at the Site, and sublet portions of the facility to Cornell-Dubilier Electronics, Inc. and to Arrow Hart Corporation, which also manufactured electrical equipment at the facility. In 1979, the Site was subdivided. The northeastern portion of the Site, approximately 9 acres, was purchased by Grant Gear Realty Trust, which leased the facility to Grant Gear Works, Inc., to produce gears for industry. The southern and western portions of the Site, approximately 16 acres, were purchased by Paul Birmingham, Paul Reardon, and Jack Reardon who further subdivided the property into seven lots and added a new street, Kerry Place.

On April 1, 1983, the MADEP, then known as the Massachusetts Department of Environmental Quality Engineering, received a telephone call from a citizen living on Pellana Road reporting past industrial waste dumping and contamination in the then vacant field of Kerry Place between Pellana Road and the Grant Gear property. As a result of this call, an initial field investigation by MADEP was conducted. On April 6, 1983, MADEP collected soil and sediment samples. The initial MADEP investigations confirmed the presence of PCBs. The MADEP immediately moved to restrict public access to the field area and marked areas within the Grant Gear fence to alert workers of the possible danger. Because of limited state funds, the MADEP requested USEPA involvement. Subsequently, USEPA contractors assisted MADEP with the collection of confirmatory samples of the oil-stained areas along the western fence line and in other areas on both the Grant Gear and Reardon properties. Based on these findings, it

was determined that an emergency removal action was warranted to address soils outside the Grant Gear Property with PCB concentrations greater than 50 parts per million (ppm).

Beginning June 23, 1983, the USEPA began removal of contaminated soils on the Site. A total of 518 tons of contaminated soil was removed and disposed. The soils were removed from locations within the Kerry Place and Grant Gear properties. Reported excavation depths were up to 30 inches. During the removal action, water samples taken from the storm drain system behind the Grant Gear Building indicated low levels of PCBs. The removal action was completed on August 5, 1983. In December 1983, the Site was further evaluated by USEPA and subsequently proposed for inclusion on the National Priorities List (NPL) on October 15, 1984. On June 10, 1986, the site was formally added to the NPL.

Based on the preliminary findings, MADEP implemented an Interim Remedial Measure (IRM) at the Site in January 1986. The IRM was considered necessary to limit access to areas of highest surface soil contamination within the fenced area of the Grant Gear Property. Specifically, a MADEP contractor installed a cap over a 1.5-acre portion of the northwest and southwest corners of the Grant Gear Property. The contaminated surface soils were covered with a filter fabric liner and 6 inches of crushed stone. The capped areas were enclosed with a 4-foot high wire mesh fence and the areas were delineated with yellow hazard tape.

3.3 INITIAL RESPONSE - PRE-ROD CLEAN UP ACTIVITIES / REMOVAL ACTIONS

The following Pre-ROD Removal Actions were performed at the Site

1. Removal Action completed in the summer of 1983 by USEPA - 518 tons of contaminated soil was removed from locations within the Kerry Place and Grant Gear properties.
2. Removal Action completed January 1986 by MADEP - an IRM was implemented to limit access to areas of highest surface soil contamination by installing a cap over a 1.5-acre portion of the Grant Gear Property and fencing the capped areas.

3.4 BASIS FOR TAKING ACTION

The groundwater, soil, sediment, and surface water on and adjacent to the Site were found to be contaminated with volatile organic compounds (VOCs), polyaromatic hydrocarbons (PAHs), and PCBs. Health threats include direct contact with or accidental ingestion of contaminated groundwater or soil, as well as inhalation of airborne contaminants volatilized from groundwater. Remedial actions were also necessary to prevent future migration of contaminants in groundwater.

3.4.1 Summary of Remedial Investigations Results

Remedial investigations at the Site revealed that contamination was present in sediment, soil, groundwater, surface water, and sludges. **Table 3-1** presents the contaminants found on the Site, the media in which they were found, and the group to which the contaminant belongs.

Table 3-1
Norwood PCBs Superfund Site
List of Contaminants

Contaminant	Media	Contaminant Group
1,1,1-Trichloroethane	Groundwater, Sediment, Soil	VOC
1,2,4-Trichlorobenzene	Groundwater, Sediment, Soil	SVOC
1,2-Dichlorobenzene	Groundwater, Sediment, Soil	VOC
1,2-Dichloroethane	Groundwater, Sediment, Soil	VOC
1,2-Trans-dichloroethylene	Groundwater, Sediment, Soil	VOC
1,3-Dichlorobenzene	Groundwater, Sediment, Soil	VOC
1,4-Dichlorobenzene	Groundwater, Sediment, Soil	Base Neutral Acids
Aroclor 1016	Groundwater, Sediment, Soil	PCBs
Aroclor 1254	Groundwater, Sediment, Soil	PCBs
Aroclor 1260	Groundwater, Sediment, Soil	PCBs
Base neutral acids	Groundwater, Sediment, Soil	Base Neutral Acids
Benzoic acid	Groundwater, Sediment, Soil	Base Neutral Acids
Chlorobenzene	Groundwater, Sediment, Soil	VOC
Chloroform	Groundwater, Sediment, Soil	VOC
PAH	Groundwater, Sediment, Soil	PAH
PCBs	Groundwater, Sediment, Soil	PCBs
Pentachloroethane	Groundwater, Sediment, Soil	VOC
Phenol	Groundwater, Sediment, Soil	Base Neutral Acids
Silver	Groundwater, Sediment, Soil	Metals
Vinyl chloride	Groundwater, Sediment, Soil	VOC
Zinc	Groundwater, Sediment, Soil	Metals

4.0 REMEDIAL ACTIONS

4.1 REMEDY SELECTION

Under its legal authorities, the USEPA's primary responsibility at Superfund sites is to undertake RAs that are protective of human health and the environment. In addition, Section 121 of CERCLA establishes several other statutory requirements and preferences, including:

- RAs, when complete, must comply with all Federal and more stringent State environmental standards, requirements, criteria, or limitations, unless a waiver is invoked.
- Select RAs shall be cost-effective and utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable; and a preference for remedies wherein treatment permanently and significantly reduces the volume, toxicity, or mobility of the hazardous substances.

The ROD for the Norwood PCBs site was published and signed in September 1989. The 1989 ROD included pumping and treating contaminated groundwater, excavating and treating soils and sediments by solvent extraction, and decontaminating the Grant Gear building. Due to higher than anticipated costs for solvent extraction, an amendment to the ROD was published and signed in May 1996. The amended ROD included demolition of the Grant Gear building, excavation and consolidation of contaminated soils and sediments under an asphalt cap and cover areas, and restoration of Meadow Brook in conjunction with the Town of Norwood's flood control project within the area of the Site. Remedial alternatives at the Site were developed to be consistent with the NCP, 40 C.F.R. § 300.68(j), which states that the selected alternative shall be cost effective; technologically feasible and reliable; and effectively mitigate and minimize damages to, and provide adequate protection of, public health, welfare, and the environment.

4.1.1 Remedial Action (RA) Objectives: Soil and Sediment

The RA objectives selected in the 1989 ROD to address contaminated soils and sediments at the Site are as follows:

- Reduce risks posed by direct contact with soil contaminated with PCBs and PAHs.
- Reduce risks posed by incidental ingestion of soils contaminated with PCBs and PAHs.
- Minimize migration of VOCs to groundwater.

The remedy selected in the 1989 ROD included soil and sediment excavation, treatment using solvent extraction, and on-site disposal.

The USEPA issued a Request For Proposal (RFP) regarding the soil/sediment solvent extraction portion of the remedy as outlined in the 1989 ROD. In 1995, the USEPA received a proposal for the implementation of this work; however, the cost greatly exceeded prior cost estimates as well as available funding for the project. Also based upon that proposal, the USEPA believed that there would be difficulties in properly siting the appropriate solvent extraction facilities on the Site due to space constraints and safety issues. Based upon these mitigating factors, the USEPA determined that it was necessary to amend the remedy for the Site. An Amended ROD was issued in 1996.

The amended ROD proposed the excavation of high concentrations of chlorinated organic compounds to eliminate a continuous source of groundwater contamination, excavation and consolidation of PCB

contaminated soil from portions of the Grant Gear property and from other surrounding properties, including sediments from the Meadow Brook, restoration of Meadow Brook consistent with the Town's flood control project, and finally cap and cover the contaminated soil and sediment. Cleanup levels for five main categories of PCB contaminated soil were set:

- Surficial soil on commercial/industrial properties: 40 parts per million (ppm) PCBs;
- Subsurface soil on commercial/industrial properties: 70 ppm PCBs;
- Surficial soil in wooded area north of Meadow Brook: 10 ppm PCBs;
- Subsurface soil in wooded area north of Meadow Brook: 50 ppm PCBs;
- Soils and sediment in Meadow Brook and its banks: 1 ppm PCBs

4.1.2 Remedial Action Objectives: Groundwater

The RA objectives selected in the 1989 ROD to address groundwater contamination at the Site are as follows:

- To reduce, within a reasonable time frame, risks to workers posed by inhalation of airborne contaminants volatilized from groundwater.
- To reduce risks to human health and the environment from current and future migration of contaminants in groundwater.

Groundwater at the Site is contaminated with PCBs, VOCs (such as trichloroethylene and vinyl chloride), and SVOCs. The 1989 ROD proposed that contaminated groundwater in the overburden and shallow bedrock aquifers would be collected by a barrier drain. The groundwater collection system would be designed to intercept contaminated groundwater both in the overburden aquifer that is moving toward Meadow Brook and in the shallow bedrock aquifer that, at the point of collection, would be discharging to the overburden aquifer. The barrier drain would be designed to collect contaminated on-site groundwater, but not draw in off-site groundwater and surface water. Contaminated groundwater collected would be treated by a groundwater treatment system, including the following treatment components: activated carbon, air stripping with vapor phase controls, and precipitation/filtration.

The amended ROD in 1996 did not change the groundwater treatment facility proposal, but did change the method of contaminated groundwater collection, calling for a series of extraction wells in lieu of the barrier drain specified in the ROD and specified discharge of treated effluent to Meadow Brook rather than re-charge to the groundwater.

4.1.3 Remedial Action Objectives: Meadow Brook Sediment

According to the 1989 ROD, steps would be taken to minimize the destruction, loss, and degradation of wetlands during implementation of the remedy, including the use of sedimentation basins or silt curtains to prevent downstream transport of contaminated sediments. A wetland restoration program would be implemented upon completion of the remedial activities in wetland areas adversely impacted by remedial action and ancillary activities.

The RA objectives selected in the 1989 ROD to Meadow Brook Restoration are as follows:

- Mitigate any future impacts of such activities to Meadow Brook and the surrounding wetland areas.

Measures to be used would include adequate sloping of stream banks to prevent excessive soil erosion into Meadow Brook. The remedy did not propose to restore the excavated Meadow Brook streambed to similar conditions existing prior to excavation. Comments from the Town of Norwood indicated that the Meadow Brook flood control project, which would include all portions of Meadow Brook targeted for sediment excavation, was slated for construction upon completion of the remedial action of the Meadow Brook area performed under Superfund. Therefore, upon completion of the soil and sediment excavation of the Meadow Brook, the brook streambed and adjacent banks from these areas would be restored to the maximum extent feasible, in a manner consistent with the Meadow Brook Flood Control Project plans and specifications. The amended ROD in 1996 did not change the proposed remedial alternative for Meadow Brook Restoration.

4.1.4 Remedial Action Objectives: Drainage System and Roof Decontamination & Grant Gear Machinery/Equipment And Floor Surfaces Decontamination

Flushing, cleaning, and/or containment and replacement of portions of Grant Gear drainage system, and cleaning and sealing of roof surfaces was proposed in the 1989 ROD. The RA objectives selected in the 1989 ROD to address drainage system and roof contamination at the Site are as follows:

- To minimize the continued release of hazardous substances to Meadow Brook.

Decontamination of surfaces of machinery, equipment, and floor surfaces within the plant areas of the Grant Gear Building were also proposed as part of the 1989 ROD. The RA objectives selected in the 1989 ROD to address grant gear machinery/equipment and floor surface contamination at the Site are as follows:

- To reduce risks to workers associated with direct contact with PCB-contaminated surfaces.
- To reduce risks to workers associated with inhalation of airborne PCBs within the Grant Gear Building.

Due to the fact that Grant Gear was no longer in operation and it was unlikely that the existing building would be used, the Amended ROD in 1996 called for demolition of the building and on-site disposal in several ways. PCB-contaminated building material was to be consolidated in the boiler room and disposed on-site under the cap. Any material, in excess of the capacity of onsite disposal areas would be disposed at an appropriate off-site property. Certain materials, which are subject to federal Resource Conservation and Recovery Act (RCRA), 42 U.S.C. §§ 6901, *et seq.*, requirements, would be disposed at an appropriate off-site facility complying with RCRA and Toxic Substances Control Act (TSCA) , 15 U.S.C. §§ 2601, *et sec.*, requirements. Debris that was uncontaminated could be reused or recycled as appropriate.

4.2 REMEDY IMPLEMENTATION

The USEPA issued a ROD in 1989 and an Amended ROD in 1996. Three separate remedial action phases have been completed at the Site. Phase 1 was completed by the USEPA and consisted of groundwater treatment. Phase 2 was conducted by the Settling Defendants and consisted of building demolition. Phase 3 was conducted by the Settling Defendants and consisted of the construction of a cap and cover over consolidated contaminated soil and sediments, and Meadow Brook restoration. Remedies implemented at the Site are briefly described in the following subsections.

4.2.1 Source Control and Soil and Sediment / Cap and Cover

The Settling Defendants performed excavation of sediments in Meadow Brook as proposed in the 1989 ROD from April 28, 1997 through July 30, 1998, with a temporary work stoppage from February 19 to May 3, 1998 during winter conditions. The Meadow Brook Remediation was divided into three sections referred to as Reach 1, 2, and 3. Excavation activities within Meadow Brook required the temporary diversion of the stream. Dewatering cells were constructed in the northern portion of the Hurley property, located west of the existing groundwater treatment plant. Two dewatering cells were constructed - one located to the west, which received sediment from Reach 1 only, and one located to the east, which received sediment from Reaches 2 and 3 only. The excavated sediment was segregated in this manner due to the lower concentrations of PCBs expected for the sediments removed from Reaches 2 and 3. On June 7, 1997, excavation of Reach 1 of Meadow Brook was completed. Approximately 2,400 cubic yards (yd^3) of material was excavated from Reach 1. On July 23, 1997, the excavation of Reach 2 was completed. The excavation of Reach 3 was performed in two phases - the first consisted of sediment removal from the arched culvert section at Dean Street, and the second consisted of sediment removal from the box culvert section. Once clean up levels (1 ppm in sediment) were achieved at 160 feet into the culvert, sediment removal activities were terminated. Approximately 2,300 yd^3 of material was excavated from Reach 2 and Reach 3.

Following the excavation of Reach 1 to the excavation grades, an area of stained soils was observed below the elevation of the design excavation grade at the former drainage outfall pipe. On June 11, 1997, after receiving direction from the USEPA, GZA collected a soil sample from the area and submitted it for laboratory analysis. Based on the analytical results, a decision was made to perform a limited removal of this stained sediment. The limited removal of the stained sediment was performed between August 14 and August 19, 1997. The estimated volume of stained soil removed is 85 yd^3.

Soils with PCB concentrations exceeding the appropriate clean up levels were targeted for excavation from several on-property areas. Trichlorobenzene (TCB) –contaminated soil identified near soil boring location SS-012, west of the former Grant Gear building, was excavated. The excavated unsaturated zone soils were backfilled from the base of the excavation to above the water table, and saturated zone soils were backfilled from above the water table in the area of the excavation to existing grade. Approximately 5,900 yd^3 of PCB-contaminated soil was excavated from the North Cover Area and stockpiled on-site for placement under the cap/cover. Approximately 2,600 yd^3 of PCB-contaminated soil was excavated from the South Cover Area and stockpiled on-site for placement under the cap/cover.

Soils with PCB concentrations exceeding the appropriate clean up levels were targeted for excavation from several off-property areas. During the activities performed for the remediation of Reach 1 of Meadow Brook, areas containing PCB-contaminated soils along the North Bank Wooded Area were discovered. Approximately 100 yd^3 of soil was excavated from the southern half of the western North Bank Wooded Area and stockpiled on-site for placement under the cap/cover. After the conclusion of the Reach 1 remediation activities, areas containing PCB-contaminated soils were discovered along the South Bank Wooded Area. Approximately 780 yd^3 of soil was excavated from the South Bank Wooded Area and stockpiled on-site for placement under the cap/cover. Previously stockpiled soils from the Reardon property were relocated to the Hurley property. The approximately 1,600 yd^3 of material was stockpiled in two areas of the Reardon property - one at the south end of the property adjacent to Dean Street, and the other located on the north end of the property adjacent to the south end of the Hurley property. Both stockpiles were excavated, transported, and stockpiled near the southwest corner of the Hurley property.

Beginning on April 30, 1997, the stockpiled soils were consolidated on-site. Criteria were used for identifying how and where the materials should be placed. Materials with PCB concentrations exceeding the risk-based, site-specific industrial/commercial clean up levels were placed within the limits of the

proposed asphalt cap. Materials with PCB concentrations below clean up levels were placed within the limits of the proposed cover areas. During soil excavation and consolidation, on-site underground storage tanks (USTs) were removed before the caps were installed. The existing 10,000-gallon underground heating fuel tank located at the southwest corner of the former Grant Gear building and the 20,000-gallon UST discovered adjacent to the 10,000-gallon tank during the building demolition phase of work at the Site were both decommissioned. Both USTs were cleaned, removed, and disposed off-site. While excavating to remove the 20,000-gallon UST, an area in the northeast corner against the former building foundation appeared to have petroleum-contaminated soil. Based on visual observations, this area with the contaminated soils was then excavated. The material was stockpiled with the previously stockpiled solids from the 20,000-gallon UST.

After the PCB-contaminated materials had been placed in accordance with the site-specific clean up levels and consolidated on-property, the areas were prepared for the installation of the cap and covers. Once the fill was placed to the appropriate grade (i.e., approximately 12 inches below the final grade in capped and covered areas), a non-woven geotextile filter fabric was laid across the cap and cover areas. An asphalt Cap or gravel cover was installed in the appropriate areas.

A detention basin and surface drainage system was designed and located to conduct runoff across the cap and cover to adequately manage the discharge of this runoff, and to maximize the area of the Property suitable for redevelopment. The subsurface drainage structures, oil and gas separators, catch basin, drainage manholes, drainage lines, flared-end sections, and outlet control structures were designed to convey overland stormwater flow to the stormwater detention basin.

4.2.2 Groundwater Treatment

The selected remedy for the management of migration of groundwater included the collection of groundwater using an extraction system consisting of nine shallow extraction wells and groundwater treatment consisting of carbon adsorption for PCB removal, air stripping for VOCs removal, and precipitation filtration for metals removal. The Groundwater Extraction and Treatment System was designed in 1994 and constructed in 1995. The objective of the system was to minimize migration by providing an integrated long-term groundwater remediation facility.

Nine groundwater extraction wells were installed in August 1995, concurrent with the construction of the treatment system. The facility was designed to operate up to 25 years. On January 11, 1996, the USEPA and the MADEP conducted a pre-final inspection of the treatment facility and it was deemed operational and functional on February 23, 1997.

Metals were removed from groundwater using a chemical precipitation and multi-media filtration process. Sodium hydroxide was added to the collected groundwater to cause the dissolved metals to precipitate out of solution and form coagulated solids. The solids from the chemical precipitation and filtration process were collected as sludge and dewatered to facilitate handling. Dewatered solids were disposed off-site in an approved landfill, which operated in compliance with RCRA. The contaminated water was then pumped to the top of an air stripping tray tower where air was blown into the bottom of the tower, as the water was introduced at the top and cascaded down. This counter current flow through the try tower transferred VOCs from the groundwater into the air stream. The air stream was then passed through a catalytic oxidizer to destroy contaminants before being released into the atmosphere. An activated carbon unit was used to remove PCBs as a final polishing step after the air stripper. All hazardous wastes transported off-site were disposed in accordance with RCRA, Department of Transportation (DOT), and Massachusetts Hazardous Waste regulations. Water extracted from the sludge during dewatering was pumped back to the inlet equalization tank and mixed with the collected groundwater for treatment.

The groundwater treatment system was operational until it was temporarily shut down in June of 2000. It is, however, still intact until a determination is made on whether it is needed anymore.

4.2.3 Meadow Brook Restoration

In accordance with the 1996 Amended ROD, and after the Settling Defendants finished excavation of contaminated brook sediments, the USEPA restored and stabilized the side slopes and bottom of Meadow Brook in order to complete the Town of Norwood's flood control project within the area of the Site. Although clean up levels for PCBs in the brook sediments was 1 ppm, the brook was only excavated to the depths required to meet the contours of the flood control project. The side slope and bottom of the brook were then restored with a layer of geotextile fabric and appropriate restoration materials (riprap, interlocking concrete blocks or precast concrete), which covered the remaining contamination located at depths below the flood control contours of the restored brook's channel.

Restoration activities along Reach 1, adjacent to the Site, took place between October and December 1997. Due to concerns related to the use of interlocking concrete blocks on the steeper slopes of Reach 2, a decision was made to utilize precast concrete channel sections. This redesign effort, as well as several high water conditions, resulted in delays in completing restoration activities in Reach 2. Reach 2 activities took place between April and July 1999. No restoration activities were required for Reach 3, as those culverted sections remained intact.

The USEPA and the MADEP performed a final inspection of the Meadow Brook Restoration project on August 11, 1999. Plantings and reseeding were completed and accepted in October 1999. On August 18, 2000, Meadow Brook O&M responsibilities and the Operation and Maintenance Manual were transferred to the Town of Norwood.

4.2.4 Grant Gear Building Demolition

The former Grant Gear facility was demolished during the demolition phase of the RA performed between October 1996 and February 1997. Elevated concentrations of PCBs were detected in or on much of the building materials, including structural steel, equipment, concrete/brick, and roof decking. Brick, concrete block, and wallboard materials were crushed and stockpiled on the building slab. Contaminated wood decking was shredded and stockpiled in the loading dock area west of the building slab. All other building materials, including asbestos-containing material, structural steel, and office and manufacturing equipment were either placed in the subgrade boiler room or disposed/recycled off-site. As the boiler room was filled, care was taken to limit void spaces. Remaining voids were filled with "flowable fill" and a 14-inch-thick reinforced concrete slab designed for anticipated loading (vehicle traffic) was constructed over the boiler room opening.

4.3 OPERATION AND MAINTENANCE

4.3.1 Cap/Cover

For several years, EPA and DEP have worked with the Settling Defendants to compel them to produce an acceptable O&M Plan for the Cap & Cover portion of remedial actions at the Norwood PCBs Site. Final plans were approved in December 2004. The purpose of the Operation & Maintenance (O&M) Plan is to outline the actions that will be taken following the completion of remedial activities at the Site to monitor the long-term effectiveness of the RA. The O&M Plan presents a description of cap inspection and maintenance activities; potential operational problems; the operational safety plan; necessary equipment, record keeping procedures; groundwater, surface water, and sediment monitoring; and a monitoring well maintenance program.

4.3.2 Groundwater Treatment

In accordance with Section 104(c)(3)(A) of CERCLA, 42 U.S.C. § 9603(c)(30)(A), states are responsible for all future O&M activities for the 30-year expected life of these remedies on fund lead projects. CERCLA and the NCP handle state O&M responsibility for groundwater cleanup actions somewhat differently than other remedial actions. The State's obligation to assure O&M of the groundwater collection and treatment system and monitoring well network will begin upon completion of the restoration phase, which is when the clean up goals in the ROD are achieved or ten years have elapsed, whichever is earlier. The finding that the groundwater clean up goals established in the ROD have been achieved will be based upon groundwater monitoring to verify that clean up goals have indeed been met. In the event that groundwater clean up goals are achieved during the restoration phase, the State will have no obligation to assure O&M of the groundwater collection and treatment system and monitoring well network. With the change in groundwater clean up levels outlined in the ESD, no long-term groundwater treatment is expected and therefore O&M of the groundwater portion is not expected to be needed.

4.3.3 Meadow Brook Restoration

An O&M Manual was prepared by the United States Army Corps of Engineers (USACE) in June 2000 for the Meadow Brook restoration. The O&M of the Meadow Brook Restoration was transferred to the Town of Norwood in August 2000. The O&M Manual was intended to enable the Town to obtain all benefits and protection for which the restoration was designed. Failure to maintain and operate the project could cause property losses and loss of public confidence in the flood protection system. The project is mostly self-regulating and O&M is limited to preventing excessive vegetation or debris accumulation, and repairing damage caused by erosion and vandalism.

Walking inspections were recommended at least every three months to detect deterioration of project features. Banks were to be inspected for damage by rain, wave wash, sloughing, or vandalism. Obstructions caused by debris were to be removed. Vegetation should be allowed to grow in certain areas, but not others. Details are discussed in the Meadow Brook O&M Manual (USACE, June 2000). Inspection and annual reporting was recommended. Monitoring of water quality and sediment in Meadow Brook will also be conducted to assess whether the remedy is remaining protective.

5.0 PROGRESS SINCE THE LAST REVIEW

5.1 PROTECTIVENESS STATEMENT FROM PREVIOUS FIVE-YEAR REVIEW

The following sections contain the protectiveness statements from the previous Five-Year Review completed in 1999.

5.1.1 1999 Protectiveness Statement

The following statement was included in the 1999 Five-Year Review Report: "I certify that the remedies selected for this Site remain protective of human health and the environment." The 1999 Five-Year Review Report was signed by Patricia L. Meaney, Director, Office of Site Remediation and Restoration.

5.2 PROGRESS SINCE PREVIOUS FIVE-YEAR REVIEW

Below is a summary of progress since the last Five-Year Review, which was conducted for this site in 1999.

A Supplemental Risk Assessment was completed in 2000 as an update and revision to the 1998 Groundwater Risk Assessment. The Supplemental Risk Assessment consisted of a human health risk assessment and a screening level ecological risk assessment. The human health risk assessment concluded that an unacceptable risk to inhalation of volatiles from groundwater and subsurface soils may be expected and engineering controls may be necessary if the use of the property changes and/or new structures were built on the site. The ecological screening assessment of potential impacts on wildlife indicated no apparent risk to receptor species, based on the available data and benchmark criteria.

The groundwater system was temporarily shut down in June 2000, and groundwater monitoring continued quarterly until October 2002.

Ownership and responsibility for the O&M of the Meadow Brook restoration was transferred to the Town of Norwood in August 2000. The Town was supplied with an O&M Manual prepared by the USACE in June 2000.

On May 11, 2001, the MADEP submitted a Groundwater Use and Value Determination for groundwater in the vicinity of the Site. The MADEP classified the groundwater at the Site as GW-3, and not a potential drinking water source.

In 2002, Foster Wheeler completed an Amendment to the Supplemental Risk Assessment. The Amendment addressed the potential exposures of a future construction worker to the Site groundwater and was conducted for possible future development. The results of the analysis indicated that the calculated hazard index exceeded the MADEP target level and the calculated carcinogenic risk slightly exceeded the MADEP target level for a hypothetical future construction worker exposed to the Site groundwater. The elevated risk and hazard index results relative to the MADEP target levels are essentially all the result of the detected Aroclor compounds in groundwater and the potential direct contact exposure route.

Foster Wheeler Environmental Corporation, on behalf of the USEPA, subsequently performed a supplemental risk analysis for the Site and developed new groundwater clean up goals or risk-based action levels (RBALs). The results are summarized in a March 2003 Technical Memorandum. The action levels were developed to reflect the protection of ecological receptors associated with the aquatic habitats of Meadow Brook and its associated riparian communities adjacent to the Site. Maximum

concentrations of VOCs and SVOCs in groundwater have all been consistently below the developed RBALs with a considerable margin. These RBALs for VOCs and SVOCs are documented as the new groundwater clean up goals in the ESD.

This risk analysis raised some concerns about the remaining PCB contamination in groundwater and its impacts on Meadow Brook. At some locations, RBALs for PCBs (4.3 ppb total PCBs) have not been met since the shutdown of the treatment facility. In addition, the surface water Ambient Water Quality Criteria (AWQC) for PCBs was exceeded at the midstream and downstream stations in the 26th sampling round. The Technical Memorandum recommended that the detections of PCBs in surface water of Meadow Brook should be further investigated. In response to these exceedances and recommendations, additional studies and risk assessments were conducted.

In July 2004, Tetra Tech FW prepared a Draft Phase 2 Ecological and Human Health Risk Summary Report as part of Phase 2 field investigations for Meadow Brook at the Site. The Phase 2 investigation is to assess PCB contributions from the Site to Meadow Brook and to examine sediment PCB distribution downstream of the Site. The report concluded that existing conditions and levels of contaminants present in Meadow Brook do not present a risk to human health or the environment.

5.3 STATUS OF RECOMMENDATIONS FROM PREVIOUS FIVE-YEAR REVIEW

In the previous Five-Year Review, a list of recommended actions for continued O&M of the remedies and associated features was developed. These issues and recommendations are presented in **Table 5-1**, which also includes a description of how the issues have been resolved.

Table 5-1
Issues & Recommendations from Previous Review

Issues from Previous Review	Action Taken and Outcome
A site-specific Risk Assessment needs to be completed.	Risk Assessment has been conducted (See Section 6.4.2)
Groundwater clean up standards should be revised to be consistent with the State's current groundwater classification.	USEPA calculated revised groundwater clean up levels and are being documented via an ESD released concurrent with this Five-Year Review
Groundwater treatment should be stopped when new clean up goals have been reached.	Groundwater treatment was temporarily stopped in June 2000. EPA will evaluate data and new standards to make a determination as to whether the groundwater remedy can be deemed complete.
Groundwater monitoring should continue to ensure that clean up standards have indeed been met.	Monitoring was continued until October 2002. Additional monitoring is planned in the spring of 2005. Monitoring of the remedy will continue as long as contaminants above action levels remain in place.

6.0 FIVE-YEAR REVIEW PROCESS

6.1 ADMINISTRATIVE COMPONENTS

The USEPA Remedial Project Manager led the Norwood PCBs Superfund Site Five-Year Review team, while Shaw provided technical assistance. The review was conducted between May 2004 and December 2004. The Scope of Work provided to Shaw included the following activities:

- Project Planning and Support
- Document Review
- Standards (ARAR) Review
- Site Interviews
- Site Inspection/Technology Review
- Community Relations
- Five-Year Review Report
- Close-Out

6.2 COMMUNITY NOTIFICATION AND INVOLVEMENT

Community notification was initiated by the release of the fact sheet announcing the start of the Five-Year Review. Stacy Greendlinger, USEPA Community Involvement Coordinator, issued the fact sheet in June 2004. The notification went out to over 300 parties including abutters, community members, and interested Federal, State, and local agencies. In addition, an article was published in the Daily News Transcript covering the start of the Five-Year Review.

Another fact sheet and notification to the newspaper will be issued announcing the completion of the report and the results of the review. A copy of the final report will be available for review at the Morrill Memorial Library, Norwood, MA; the USEPA's Region 1 Office; and the USEPA's website at http://www.epa.gov/region1/superfund/sites/norwood.

6.3 DOCUMENT REVIEW

The project team reviewed documents and site files to become knowledgeable with the history and status of clean up, and to assess the protectiveness of RAs at the site. Specific documents reviewed included:

1. September 29, 1989 Record of Decision
2. May 17, 1996 Amended Record of Decision
3. September 23, 1999 Preliminary Close-Out Report
4. December 30, 1999 Five-Year Review Report
5. April 2000 Final Supplemental Risk Assessment (Foster Wheeler)
6. June 2000 Operation and Maintenance Manual – Meadow Brook Restoration (USACE)
7. August 2000 Interim Remedial Action Report for the Groundwater Treatment Plant (Foster Wheeler)
8. May 11, 2001 MADEP Groundwater Use and Value Determination

9. January 2002 Meadow Brook Restoration Remedial Action Report (USACE)
10. May 2002 Final Amendment to the Supplemental Risk Assessment (Foster Wheeler)
11. March 2003 Final Technical Memorandum – Development of Risk-Based Action Levels (Foster Wheeler)
12. March 2003 27th Quarterly Groundwater Monitoring Report (Nobis)
13. September 2003 Soil/Brook Remedial Construction Report (GZA)
14. January 2004 Environmental Monitoring Work Plan (GZA)
15. January 2004 Operation and Maintenance Plan (GZA)
16. July 2004 Draft Phase II Ecological and Human Health Risk Summary Report (Tetra Tech FW)
17. December 2004 Operation & Maintenance Plan (GZA)

6.4 DATA REVIEW

6.4.1 Groundwater Monitoring Data

Quarterly groundwater monitoring continued throughout the operation of the groundwater treatment system. In June 2000, the groundwater treatment system was temporarily shut down, however, quarterly groundwater monitoring continued for two years beyond the system shutdown. The last groundwater monitoring round was conducted in October 2002 (the 27th monitoring round). An additional round of groundwater monitoring is planned for the Spring 2005.

The 27th quarterly groundwater monitoring round involved the collection and analysis of samples from thirty-one monitoring wells, nine extraction wells, and three surface water sample locations. Groundwater gauging rounds continue to indicate east to northeast flow in the overburden aquifer and east with a southeast component in the bedrock aquifer.

Laboratory analytical data for the 27th quarter was similar to results in prior monitoring rounds, except for a few minor changes. Certain monitoring and extraction wells showed increased total chlorinated volatile organics (TCV) concentrations, including EW-11. Other wells, including EW-8 and EW-9, decreased since the previous monitoring round. Groundwater chemical and hydrogeological data continue to suggest that elements of the VOC plume are shifting north and migrating toward Meadow Brook. Trace levels of chlorinated volatiles were again detected in Meadow Brook at one sample location.

The volatile data for the 27th monitoring round indicated that the frequency of vinyl chloride increased significantly (20/40 wells) in comparison to previous sampling rounds (12/40 wells). Also, high vinyl chloride concentrations were observed in EW-8, EW-9, ME-11A, and ME-8. The results suggest that increasing amounts of vinyl chloride may be resulting from the degradation of Trichloroethylene (TCE).

The results of the 27th groundwater monitoring round depict a decreasing chlorinated hydrocarbon product/daughter mole ratio, moving eastward. These results suggest that active TCE biodegradation may be occurring at the Site. The results for vinyl chloride also suggest the likelihood of ongoing biodegradation, particularly in some northern portions of the Site.

Trace levels of PCBs were detected in Meadow Brook surface water at one sampling location. This result supports the previous detection of PCBs in surface water in the previous (26th) monitoring round. This data raised the possibility that PCBs might be slowly migrating toward Meadow Brook with Site groundwater. PCBs were detected in wells ME-11B, EW-4, and EW-5 near Meadow Brook. Analytical Results from the 27th Quarterly Sampling Event are given in **Table 6-1**.

Table 6-1
27th Quarterly Groundwater Analytical Results – Data Summary & Comparison to Standards

Chemical	ROD Clean Up Level mg/L	Number of Samples Exceeding ROD Clean Up Levels	New Clean Up Goals mg/L	Number of Samples Exceeding New Clean Up Levels	MCP GW-2 mg/L	MCP GW-3 mg/L	Detection Frequency	Maximum Concentration mg/L	Location of Maximum Concentration
Volatile Organic Compounds									
Chlorobenzene	NA	NA	NA	NA	1	0.5	4/40	0.063	MW-1A
Cis-1,2-Dichloroethene	NA	NA	NA	NA	20	50	28/40	2.2	EW-9
trans-1,2-Dichloroethene	NA	NA	NA	NA	20	50	13/40	0.160	EW-9
1,2-Dichloroethylene (total)	0.175	8	3,660	0	20	50	28/40	2.5	EW-9
Tetrachloroethene	0.005	1	37	0	3	5	4/40	0.0052	EW-5
1,1,2-trichloroethane	NA	NA	NA	NA	20	50	3/40	0.012	EW-11
Trichloroethylene	0.005	15	108	0	0.3	20	26/40	1.4	MW-1B-R
Vinyl Chloride	0.002	15	310	0	0.002	40	20/40	0.088	ME-11A
Semi-Volatile Organic Compounds									
1,2-Dichlorobenzene	NA	NA	NA	NA	10	8	3/40	0.017	MW-1B-R
1,3-Dichlorobenzene	NA	NA	NA	NA	10	8	2/40	0.030	MW-1A
1,4-Dichlorobenzene	0.005	4	4.6	0	30	8	5/40	0.030	MW-1A
1,2,4-Trichlorobenzene	0.030	2	34	0	10	0.5	8/40	1.4	MW-1BR
PCBs									
Aroclor-1016	NA	NA	NA	NA	NA	0.0003	0/40	NA	NA
Aroclor-1221	NA	NA	NA	NA	NA	0.0003	0/40	NA	NA
Aroclor-1242	NA	NA	NA	NA	NA	0.0003	1/40	0.00028	B19R
Aroclor-1248	NA	NA	NA	NA	NA	0.0003	4/40	0.0084	MW-1BR
Aroclor-1254	NA	NA	NA	NA	NA	0.0003	9/40	0.012	B4
Aroclor-1260	NA	NA	NA	NA	NA	0.0003	0/40	NA	NA

NA- Not Applicable
New Clean Up Goals are published in the ESD

The results of the 27th quarterly groundwater monitoring report indicated the continued presence of target chlorinated volatile organics in groundwater across the Site, with sporadic detections of SVOCs, particularly 1,2,4-trichlorobenzene. PCBs were detected in less than half of the wells across the Site. VOCs did not exceed Massachusetts Contingency Plan (MCP) GW-3 standards for any chlorinated solvents, although vinyl chloride and TCE were determined to exceed MCP GW-2 standards. SVOCs were detected in eight samples. This is one more than the previous quarter. SVOCs were detected below MCP GW-2 and GW-3 standards, except 1,2,4-Trichlorobenzene, which was detected above GW-3 but well below the RBAL concentration of 34 ppm. None of these results exceeded the new groundwater clean up levels, documented in the ESD. PCBs, for which no cleanup standard was set, were detected in a total of 14 wells. PCB concentrations ranged from 0.05 µg/L to 12 µg/L. PCB concentrations in twelve samples equal or exceed the MCP GW-3 standard of 0.3 µg/L as well as the RBAL that was calculated for PCBs. In addition to the groundwater monitoring round planned for Spring 2005, future groundwater data will be collected by the Settling Defendants as part of their Operation and Maintenance responsibilities.

6.4.2 Risk Assessment Data

An Initial Groundwater Risk Assessment for the Site was completed in 1998 by GZA. The Groundwater Risk Assessment evaluated exposure to chemicals that may volatilize from groundwater into the indoor air of a proposed building and an environmental exposure to groundwater that may discharge to Meadow Brook.

A Supplemental Risk Assessment was completed in 2000 by Foster Wheeler as an update and revision to the 1998 Groundwater Risk Assessment (Foster Wheeler, 2000). The Supplemental Risk Assessment consisted of a human health risk assessment and a screening level ecological risk assessment. The human health risk assessment focused on potential inhalation of compounds volatilized from contaminated subsurface soils and groundwater in a possible future commercial building that could be constructed on the Site. The screening level ecological risk assessment focused on the potential impacts of the discharge of contaminated groundwater to the Meadow Brook. The assessment indicated that contributions to the projected carcinogenic risk from the subsurface soil and groundwater exceed the target values for each source medium separately. The driving factors of risk were the presence of vinyl chloride and trichloroethene in groundwater and trichloroethene and methylene chloride in subsurface soil. An assessment of potential indoor inhalation risks under future conditions assuming the shutdown of the groundwater treatment system was also performed. The projected risk and hazard results were generally similar to the current conditions scenario with somewhat higher risk and hazard levels. The human health risk assessment concluded that an unacceptable risk to inhalation of volatiles from groundwater and subsurface soils may be expected and engineering controls may be necessary if the use of the property changes and/or new structures were built on the site. The screening level ecological risk assessment indicated no apparent risk to receptor species, based on the available data and benchmark criteria. In 2002, Foster Wheeler completed an Amendment to the Supplemental Risk Assessment. The Amendment addressed the potential exposures of a future construction worker to the Site groundwater. The results of the analysis indicated that the calculated hazard index exceeded the MADEP target level and the calculated carcinogenic risk slightly exceeded the MADEP target level for a hypothetical future construction worker exposed to the Site groundwater. These projected results are based on an assumption of repetitive dermal inhalation exposure over the course of a construction effort that may be associated with a new commercial building. The elevated risk and hazard index results relative to the MADEP target levels are essentially all the result of the detected Aroclor compounds in groundwater and the potential direct contact exposure route. Thus, any future excavation activities at the site for redevelopment or for other purposes, would likely require appropriate Health and Safety training and Personal Protective

Equipment (PPE) to minimize risk to construction workers and be conducted in compliance with applicable laws and regulations and the Institutional Controls for the site.

Foster Wheeler Environmental Corporation, on behalf of USEPA, subsequently performed a supplemental risk analysis for the Site and developed new groundwater clean up goals [or Risk-Based Action Levels (RBALs)] acknowledging MADEP's revised groundwater classification. The results are summarized in a March 2003 Technical Memorandum. The action levels were developed to reflect the protection of ecological receptors associated with the aquatic habitats of Meadow Brook and its associated riparian communities adjacent to the Site. Maximum concentrations of VOCs and semi-volatile organic compounds (SVOCs) in groundwater have all been consistently below the developed RBALs with a considerable margin. These RBALs are documented as the new groundwater clean up goals in the ESD. This risk analysis raised some concerns about the remaining PCB contamination in groundwater and its impacts on Meadow Brook. RBALs for PCBs have not been made since the shutdown of the treatment facility. The RBAL has been met for PCBs in all wells adjacent to Meadow Brook. Surface water Ambient Water Quality Criteria (AWQCs) for PCBs was exceeded at the midstream and downstream stations in the 26th sampling round. The Technical Memorandum recommended that the detections of PCBs in surface water of Meadow Brook should be further investigated and a second phase ("Phase II") of investigation was initiated.

In July 2004, Tetra Tech FW prepared a Draft Phase II Ecological and Human Health Risk Summary Report as part of Phase II field investigations for Meadow Brook at the Site. The Phase II investigation is to assess PCB contributions from the Site to Meadow Brook and to examine sediment PCB distribution downstream of the Site. The report concluded that existing conditions and levels of contaminants present in Meadow Brook do not present a risk to human health or the environment. No human health concerns were indicated by the groundwater data relative to current or projected land use. A possible human health concern associated with long-term direct contact exposure to soil was indicated at discrete locations off-site and down stream of the site, adjacent to the Neponset River and the Town of Norwood electrical Substation. No human health concerns relating to sediment samples taken from Meadow Brook and the Neponset River were indicated. Based on this data, and the 1989 ROD's determination that it was technically impracticable to reduce PCB concentrations in groundwater to health-based levels, no groundwater clean up level for PCBs was established by the ROD or the ESD. Any secondary risk to exposure to PCB contamination on the site (in soil or groundwater) will continue to be controlled via institutional controls. Periodic surface water and sediment monitoring in Meadow Brook will continue to be conducted to evaluate long-term compliance with AWQCs and to ensure that they do not increase to a level that may pose an unacceptable risk to human health or the environment.

6.5 SITE INSPECTION

The Five-Year Review Site Inspection to assess the protectiveness of the remedies was conducted on May 12, 2004. The inspection was conducted by Sharon Hayes, USEPA Remedial Project Manager, Bob Cianciarulo, USEPA Massachusetts Superfund Section Chief, Chris Turek, USACE Resident Engineer, Daniel Keefe, MADEP Project Manager, and Eileen London and Pernilla Lindblom of Shaw.

Pernilla Lindblom and Eileen London returned to the Site on September 7, 2004 to verify that some issues had been addressed since the original Site visit. **Table 6-2** provides a summary of the Site components that were inspected and a brief description of findings. Issues and recommendations are further discussed in Section 8.0. Photos can be found in **Appendix D**.

Table 6-2
Site Investigation Summary

Access and Site Roads	The current occupant (storing new automobiles) has staff that routinely visit the site to pick up and drop off vehicles. After business hours, cars are routinely parked to block the entrance thereby inhibiting vehicular access; however, pedestrian access is unrestricted
Groundwater Treatment Plant	The building appears in good condition. See Photograph 1 and 2. The treatment plant is not currently operating, however, the equipment appears to be in good condition. The discharge pipe is located adjacent to Meadow Brook, and has been capped while the system is not in use. See Photograph 3.
Treatment facility access and security	A security system is installed in the treatment facility. The building is kept locked when it is not occupied.
Detention Basin (along Meadow Brook)	The detention basin was dry during the Site visit, which is the normal condition. See photographs 4 and 5. Gravel from plowing activities was noted in the detention basin. See photograph 6. Some vegetation was noted to have begun growing in the spillway. See photograph 7. In September, Shaw verified that the vegetation issues had been addressed in the basin and had been mowed.
Detention Basin Side Slopes	Some areas of missing riprap were noted along the landfill cover on the detention basin slopes. The geotextile fabric was exposed in these missing riprap areas. See photograph 8. In September, it was verified that these issues had been resolved, although the geotextile was beginning to show again and this may be a reoccurring issue, which should be checked. See photograph 9.
Cover Areas	Cover areas appear to be in good condition. Some vegetation (grass) has begun to grow which may be a future issue. See photograph 10 and 11.
Cap Areas	The cap appears to be in good condition. No areas of settling were noted. A few cracks were noted which should be investigated. See photograph 12. Gravel was noted on the northern cap area (possibly from snow removal activities). See photograph 13. It was verified in September that this gravel had been removed. See photograph 14. Much of the cap areas had parked cars on it, which limited observation ability.
Cap Area Use	Cape Cod berms were damaged on both the north and south side of the cover area, due to plowing. See photographs 15 though 17. Repairs may have begun by the second visit, but were not complete. See photograph 16.
Monitoring Wells	A monitoring well was found without a lock in the north cap area. See Photograph 18.
Meadow Brook	No vegetation or debris was encountered which could impede flow. See photographs 19 through 22.

Although no major issues were found that would affect the protectiveness of the remedies, there were several issues that, if not corrected or if left unchecked, could affect components at the site or could potentially affect the protectiveness of the remedy. See Section 8.0.

6.6 INTERVIEWS

Interviews of owners and businesses adjacent to the Site, and of local and State officials, were conducted. The objective of the informal interviews was primarily to obtain general information and to update current understanding of activities at the Site.

A few neighboring businesses were visited on June 22, 2004. During these visits, John Marcelonis (sales person at Direct Tire), Bill Eliot (Fill-In Manager at Lappens), and Michelle Coffin (Curriculum Coordinator at Neponset Valley Child Care) were interviewed. No significant problems regarding the Site were identified during the interviews.

On August 5, 2004, Steve Costello, Norwood's Town Planner, was interviewed. The main issue that he voiced was possible redevelopment plans for the Site. He believed that the public would not have a problem with redevelopment, as long as the cap was not disturbed. He hoped that the next possible developer would be prepared to present plans to the public and would work with the EPA and Town of Norwood on a redevelopment plan.

On August 12, 2004, Dan Keefe (the current DEP Site Project Manager) and Jay Naparstek (the former DEP Site Project Manager) were interviewed. Both believed that the main issues regarding the Site are as follows:

1. An acceptable O&M Plan had not been submitted for the Cap and Cover, although they expected one by the end of the year.
2. Revised Institutional Controls have been drafted but have not yet been filed for the Site.

On August 18, 2004, Joe Laham (the Site owner) was interviewed. Joe Laham was dissatisfied with the EPAs performance at the Site. He believes that the EPA should take a more proactive role in convincing the public that there are no environmental issues with the redevelopment of the Site, and that the EPA should be more helpful in getting the public to accept development plans. He was under the impression that the groundwater treatment system plant was to be demolished soon and wanted to know the timeframe for this. He had no knowledge of when institutional controls were to be issued.

Chris Turek of the Army Corps of Engineers was interviewed on September 12, 2004. He believed that the construction went well, with the exception of a few minor difficulties. He speculated that if more monitoring wells had been installed, or if they had been located differently, that more definitive information may have been obtained, which could have made the treatment decisions more definitive.

Interview notes are provided in **Appendix C**.

7.0 TECHNICAL ASSESSMENT

7.1 QUESTION A: IS THE REMEDY FUNCTIONING AS INTENDED BY THE DECISION DOCUMENTS?

The review of documents, ARARs, and the results of the May 2004 site inspection indicate that the remedy is operating and functioning as designed. Based on observations during the site inspection, the RA has been determined to be performing as expected. New clean up goals should be published and a groundwater sampling round should be conducted to verify that the new clean up goals are being met.

Indicators of potential issues pointing to a failing remedy would be cap erosion or disturbance, increased contaminant concentrations in groundwater, or increased contaminant concentrations in Meadow Brook. Continued monitoring of groundwater as well as Meadow Brook surface water and sediment will be critical in evaluating the functionality and protectiveness of the remedy.

Institutional Controls (ICs) have been recorded on the main site property (921 Providence Highway) as part of a settlement with then-owners Grant Gear, Inc. (often referred to as the "Hurley Controls", after Grant Gear's owners, the Hurley brothers). Those ICs describe the remedy as planned in the 1989 ROD. Subsequently, new ICs were drawn up to reflect the amended remedy and incorporated into the Prospective Purchaser Agreement with Joe Laham (the Site owner). Those new ICs have not yet been recorded on the property deed. Until new ICs are changed the "Hurley Controls" remain in effect. ICs for the Meadow Brook Property were drafted and included as part of a Consent Decree with the Town of Norwood, but may need to be modified and have not been recorded yet.

7.2 QUESTION B: ARE THE EXPOSURE ASSUMPTIONS, TOXICITY DATA, CLEAN UP LEVELS, AND REMEDIAL ACTION OBJECTIVES USED AT THE TIME OF REMEDY SELECTION STILL VALID?

Soil and Sediment

Soil and Sediment standards identified in the 1989 ROD were updated in the 1996 ROD amendment. These standards have not been revised since the amended ROD and there are no newly promulgated standards that call into question the protectiveness of the remedy. Criteria considered in selecting clean up levels at the Site have not changed and will not affect the protectiveness of the remedy.

Land use or expected land use on or near the Site has not changed; however, proposed redevelopment planning is ongoing. There have been no newly identified human health or ecological routes of exposure or receptors identified or changed in a way that could affect the protectiveness of the remedy. There are no newly identified contaminants or contaminant sources. Also, there are no unanticipated toxic byproducts of the remedy not previously addressed by the decision documents. Physical Site conditions have not changed in a way that could affect the protectiveness of the remedy. However, continued monitoring of groundwater as well as Meadow Brook surface water and sediment will be critical in evaluating the functionality and protectiveness of the remedy.

Containment characteristics and toxicity factors for contaminants of concern at the Site have not changed in a way that could affect the protectiveness of the remedy. In addition, standardized risk assessment methodologies have not changed in a way that could affect the protectiveness of the remedy.

Groundwater

The Site aquifer has been reclassified by the State and it is no longer classified as a current or potential future drinking water supply by the Commonwealth of Massachusetts. Therefore, Maximum Contaminant Levels (MCLs) promulgated under the Safe Drinking Water Act, and Massachusetts Drinking Water Standards are not applicable. As a result of the revised aquifer classification and additional risk assessment activities, the USEPA calculated revised groundwater clean up goals which are being documented in the ESD published concurrent with this Five Year Review.

7.3 QUESTION C: HAS ANY OTHER INFORMATION COME TO LIGHT THAT COULD CALL INTO QUESTION THE PROTECTIVENESS OF THE REMEDY?

No newly identified human health or ecological risks have been identified to date. No other information has come to light since the May and September 2004 site inspections that could affect the protectiveness of the remedy.

7.4 ARARS REVIEW

A review of ARARs was conducted to evaluate whether the RAs are protective of human health and the environment. The review accounted for updated regulatory standards promulgated since the RODs were issued. For the purposes of this review and compliance with current requirements, ARARs are summarized in a table presented in Appendix B.

An analysis of newly promulgated or modified requirements of Federal and State environmental regulations was conducted to determine if these new ARARs change the protectiveness of the remedy. The evaluation includes a determination of whether the regulation is currently an ARAR or TBC, and whether the remediation, as planned in the ROD and amended ROD, would be in compliance with the requirement. Action-, location-, and chemical-specific requirements are tabulated and located in Appendix B of this report.

The standards review was based on the review of USEPA-provided documents, as well as published Federal, State, and local rules and regulations. Recommendations are made as to whether any changes to the list of contaminants of concern need to be made. Under Section III.A of Attachment I "Explanation of Five-Year Review Policy" to OSWER Directive 9355.7-02, the Commonwealth of Massachusetts should be requested to identify State ARARs promulgated or modified since the ROD and amended ROD were signed, which may have a bearing on the protectiveness of the remedy. According to the DEP, the only regulation that should affect the ARARs is the change in groundwater classification from GW-1.

Few changes to the ARARs have occurred since the Amended ROD was signed. Most location specific ARARs currently apply to ongoing monitoring and O&M activities rather than the construction activities discussed in the last Five-Year Review. Ambient Water Quality Criteria (AWQCs) have been added as action-specific standards for monitoring water quality in Meadow Brook. The ARARs that are no longer necessary have been removed from the list (presented in Appendix B)

It should be noted that Massachusetts Drinking Water Standards and Maximum Contaminant Levels should have been included in the list of chemical-specific ARARs originally; however, they are no longer applicable since the groundwater in the area has been reclassified.

8.0 ISSUES

Table 8-1 provides a summary of the issues identified at the Site during this Five-Year Review.

Table 8-1
Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
New groundwater monitoring data should be collected and evaluated relative to revised clean up standards	Y	Y
Meadow Brook surface water and sediment should continue to be monitored to determine compliance with ARARs; ensure that there is not an unacceptable risk to human health and the environment; and that the remedy remains protective	N	Y
New Institutional Controls have not been recorded.	N	Y
A monitoring well was observed without a lock in the north cap area.	N	N
No O&M procedures have been conducted in the Meadow Brook.	N	Y
Cracks were noted in the cap, which need to be investigated.	N	N
Cap Cod berms were damaged during plowing.	N	N

9.0 RECOMMENDATIONS AND FOLLOW-UP ACTIONS

Table 9-1 provides recommended follow-up actions for issues discovered at the Site during this Five-Year Review.

Table 9-1
Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Groundwater Treatment	Continue to monitor groundwater to determine compliance with new clean up goals, evaluate whether groundwater remedy can be deemed complete.	USEPA	USEPA	6/05	Y	Y
Meadow Brook Monitoring	Continue to monitor surface water and sediment to determine compliance with ARARs and protectiveness of the remedy	USEPA, Settling Defendants	USEPA	Periodic	N	Y
Meadow Brook O&M	Maintain Meadow Brook O&M	Town of Norwood	USEPA	Periodic	N	Y
Cap & Cover O&M	Maintain Cap/cover O&M	Settling Defendants	USEPA	Periodic	N	Y
ICs	Record new ICs	Owner and MADEP	MADEP	6/05	N	Y
Owner O&M	Owner should follow recommendations outlined in Cap & Cover O&M Plan	Property Owner	USEPA	Periodic	N	Y

10.0 PROTECTIVENESS STATEMENTS

10.1 PROTECTIVENESS

The remedy at Norwood PCBs Superfund Site protects human health and the environment because new clean-up goals have been met, Operation & Maintenance (O&M) Plans have been submitted by the PRPs and approved for the Grant Gear Property, and institutional controls are in place. Meadow Brook O&M has been transferred to the Town of Norwood. However, in order for the remedy to be protective in the long-term, the following actions need to be taken; institutional controls for the industrial site and Meadow Brook must be updated and implemented and monitoring and Operation and Maintenance at the site must be conducted regularly.

11.0 NEXT REVIEW

In accordance with the June 2001 Comprehensive Five-Year Review Guidance, the third Five-Year Review will be due five years from the signature date of this (second) Five-Year Review.

12.0 REFERENCES

1. Foster Wheeler Environmental Corporation, 2000. Final Supplemental Risk Assessment, Norwood PCB Superfund Site. April 2000.

2. Foster Wheeler Environmental Corporation, 2000. Final Interim Remedial Action Report for the Norwood PCB Superfund Site Groundwater Treatment Plant. August 2000.

3. Foster Wheeler Environmental Corporation, 2002. Final Amendment to the Supplemental Risk Assessment, Norwood PCB Superfund Site. May 2002.

4. Foster Wheeler Environmental Corporation, 2003. Final Technical Memorandum, Development of Risk-Based Action Levels for the Protection of Ecological Receptors for Contaminants of Potential Concern in the Groundwater at the Norwood PCB Superfund Site. March 2003.

5. GZA Geo Environmental, Inc., 2003. Soil/Brook Remedial Construction Report. September 2003.

6. GZA Geo Environmental, Inc., 2004. Operation and Maintenance Plan, Norwood PCB Superfund Site. January 2004.

7. GZA Geo Environmental, Inc., 2004. Environmental Monitoring Work Plan, Norwood PCB Superfund Site. January 2004.

8. GZA Geo Environmental, Inc., 2004. Operation and Maintenance Plan, Norwood PCB Superfund Site. December 2004.

9. Massachusetts Department of Environmental Protection, 2001. Groundwater Use and Value Determination. May 11, 2001.

10. Nobis Engineering Inc. and Foster Wheeler Environmental Corporation, 2002. 27th Quarterly Groundwater Monitoring Report, Norwood PCB Superfund Site, Norwood, Massachusetts, October 2002 Sampling Event. March 4, 2003.

11. Tetra Tech FW, Inc., 2004. Draft Phase II Ecological and Human Health Risk Summary Report, Norwood PCB Superfund Site. July 2004.

12. U.S. Environmental Protection Agency, 1989. USEPA Superfund Record of Decision, Norwood PCBs. September 29, 1989.

13. U.S. Environmental Protection Agency, 1996. USEPA Superfund Record of Decision Amendment, Norwood PCBs. May 17, 1996.

14. U.S. Environmental Protection Agency, 1999. Preliminary Close-Out Report. September 23, 1999.

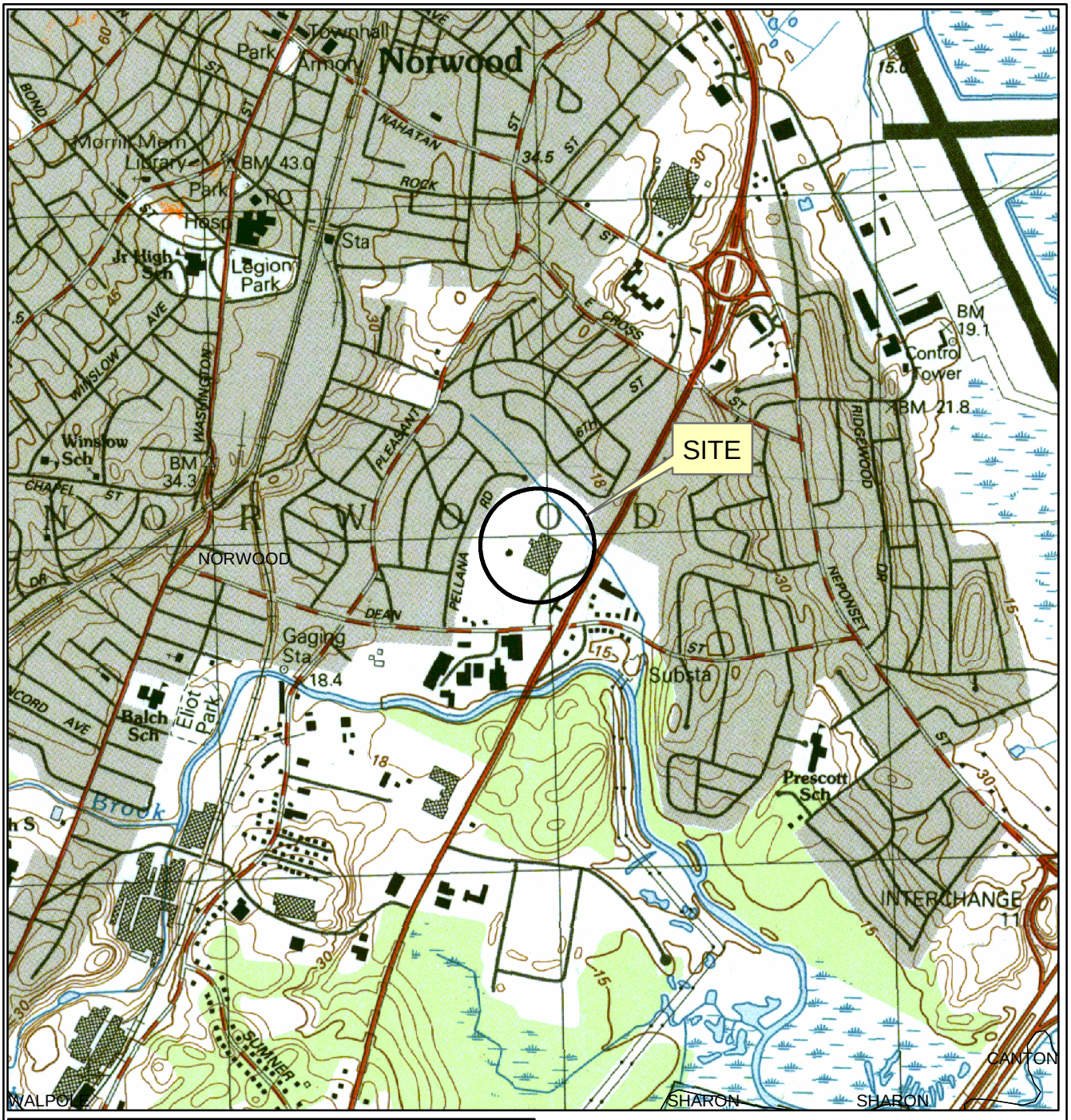
15. U.S. Environmental Protection Agency, 1999. Five-Year Review, Norwood PCB Superfund Site, Norwood, Massachusetts. December 1999.

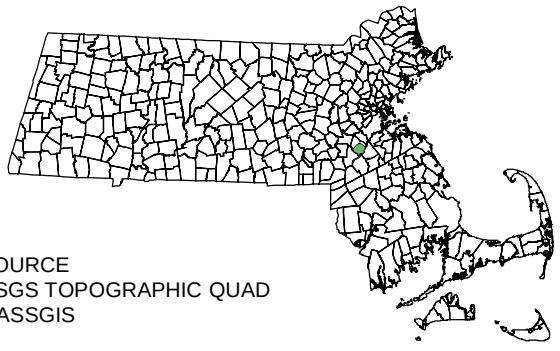
16. U.S. Environmental Protection Agency, 2001. Comprehensive Five-Year Review Guidance. U.S. Environmental Protection Agency, Office of Emergency and Remedial Response. June 2001.

17. U.S. Army Corps of Engineers, 2000. Operation and Maintenance Manual, Meadow Brook Restoration, Norwood, Massachusetts. June 2000.

18. U.S. Army Corps of Engineers, 2002. Meadow Brook Restoration Remedial Action Report, Norwood, Massachusetts. January 2002.

APPENDIX A
SITE MAPS





SOURCE
USGS TOPOGRAPHIC QUAD
MASSGIS

FIGURE 1
SITE LOCUS PLAN
NORWOOD PCB SUPERFUND SITE
NORWOOD, MASSACHUSETTS

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0 0.1 0.2 0.4 0.6 0.8 Miles

Shaw® Shaw Environmental, Inc.

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APPENDIX B
TABLES DOCUMENTING ARARs

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTION TAKEN TO ATTAIN ARARs
CHEMICAL SPECIFIC ARARs:				
Federal Criteria, Advisories, and Guidance	Technical Basis for Deriving Sediment Quality Criteria for Non-ionic Organic Contaminants for the Protection of Benthic Organisms Using Equilibrium Partitioning (EPA-822-R-93-011) cleanup levels.	To be Considered	This guidance is used to establish criteria to protect the aquatic organisms in streams and to determine environmental risk within the sediment and to set sediment.	The criteria established were used to evaluate risks to aquatic organisms exposed to contaminated water entrained
	Clean Water Act – Sec. 304 Federal Ambient Water Quality Criteria 33 USC 1314; 40 CFR 122.44	Relevant and Appropriate	Federal AWQC are criteria for protection of human health and aquatic organisms which have been developed for carcinogenic and Brook noncarcinogenic compounds. AWQC are developed under the Clean Water Act (CWA) as guidelines from which states develop water quality standards.	AWQC were used to characterize risks to fresh water aquatic life in Meadow Brook
	EPA Carcinogenic Assessment Group Potency Factors	To be Considered	Potency factors are developed by the EPA from Health Effects Assessments or Evaluation by the Carcinogenic Assessment Group.	EPA Carcinogenic Potency Factors were used to complete the individual incremental cancer risk resulting from exposure to site contaminants.
	EPA Risk Reference Doses (RfDs)	To be Considered	RfDs are does levels developed by the EPA for non-carcinogenic effects.	EPA RfDs were used to characterize risks due to exposure to contaminants on site.
LOCATION SPECIFIC ARARs				
Federal Regulatory	Wetlands Executive Order (EO 11990) 40 CFR Part 6, Appendix A	Applicable	Under this regulation, Federal agencies are required to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance natural and beneficial values of wetlands.	Any redevelopment or O &M will include all all practicable means of minimizing harm to wetlands.
	Floodplains Executive Order (EO 11988) 40 CFR Part 6, Appendix A	Applicable	Federal agencies are required to reduce the risk of flood loss, to minimize the impact of floods, and to restore and preserve the natural and beneficial values of floodplains.	The remedial action was designed to keep all activities out of the floodplain to the greatest extent practicable.
	Clean Water Act (CWA) – Section 404 Dredge and Fill Requirements (33 U.S.C. 1344; 40 CFR Part 230)	Applicable	No activity that adversely affects a wetland shall be permitted if a practicable alternative that has less effect is available.	Ongoing monitoring and O&M activities in and adjacent to Meadow Brook or any other Site wetlands will meet these standards.
	Fish and Wildlife Coordination Act 16 U.S.C. 661	Applicable	Before undertaking any Federal action that causes the modification of any body of water or affects fish and wildlife.	Federal and State fish and wildlife agencies will be consulted concerning any monitoring and O&M activities in and adjacent to Meadow Brook.

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTION TAKEN TO ATTAIN ARARs
	Resource Conservation and Recovery Act (RCRA) Location Standards (40 C.F.R. 264.18)	Relevant and Appropriate	This regulation outlines the requirements for constructing a RCRA facility on a 100-year floodplain.	Hazardous waste disposed of or generated within the floodplain of Meadow Brook will be managed to prevent a release of hazardous waste in the event of a flood event.
State Regulatory	Massachusetts Wetlands Protection Act (M.G.L. c.131 Section 40 : 310 CMR 10.00)	Applicable	These regulations outline the requirements necessary to work within 100 feet of a wetland.	All redevelopment, monitoring, or O&M work within areas regulated under this standard will be conducted in compliance with these regulations.
	Massachusetts Waterways Regulations (M.G.L. c.21, Sections 26-53; 314 CMR 9.00)	Applicable	Regulates work within waterways, including water quality protection.	All redevelopment, monitoring, or O&M work within or adjacent to Meadow Brook will comply with these standards.
ACTION SPECIFIC ARARs				
Federal Regulatory Requirements	Resource Conservation and Recovery Act (RCRA) Subtitle C (40 C.F.R. 260-262)	Applicable (for generated wastes)/; Relevant and Appropriate (for closure/ post closure)	RCRA regulates the generation, transport, storage, treatment, and disposal of hazardous Waste. CERCLA specifically requires (in Section 121(d)(3) that hazardous substances from response actions be disposed of at facilities in compliance with Subtitle C of RCRA	Wastes generated during monitoring or O & M activities will be characterized and handled in accordance with applicable RCRA regulations. Wastes left in place under the cap will be managed in compliance with closure and post-closure standards.
	Toxic Substances Control Act (TSCA), 15 U.S.C. §§ 2601, *et seq.*, 40 C.F.R. 761.75	Applicable	Establishes standards for PCB landfills, including permitting waivers for clay soils, synthetic liner, 50 feet to water table, and leachate collection requirements upon a finding by the Regional Administrator.	Closure/post closures standards (incorporating waivers invoked under the ROD amendment) for the capped PCB wastes will be followed.
	Toxic Substances Control Act (TSCA), (40 C.F.R. 760.60)		Establishes treatment and disposal standards for PCB wastes generated as part of redevelopment, monitoring or O&M activities.	Treatment and disposal standards for PCB generated wastes will be satisfied.
	Clean Water Act - Sec. 304 Federal Ambient Water Quality Criteria 33 USC 1314; 40 CFR 122.44	Relevant and Appropriate	AWQC are developed under the Clean Water Act (CWA) as guidelines from which states develop water quality standards.	AWQC are used to monitor water quality in Meadow Brook to assess the protectiveness of the remedy.
	Guide on Remedial Actions at Superfund Sites with PCB Contamination (OSWER Directive 9355.4-01, August 1990)	To be considered	Sets forth guidelines for implementing remedial actions for PCBs	Ongoing monitoring and O&M activities will be conducted consistent with the goals of this guidance.
State Regulatory Requirements	Massachusetts Groundwater Protection Regulations 314 CMR 6.00	Relevant and Appropriate	These regulations establish the criteria for classifying ground water and for establishing monitoring standards.	Groundwater has been reclassified as Class III, designated for uses other than as a source of potable. water supply. The regulations also set standards that will be used for monitoring.

AUTHORITY	REQUIREMENT	STATUS	REQUIREMENT SYNOPSIS	ACTION TAKEN TO ATTAIN ARARs
	Massachusetts Ambient Air Quality Standards	Applicable	These regulations specify emissions standards for particulates and lead.	All redevelopment, monitoring and O&M activities will be conducted in a manner to minimize the generation of dust or other hazardous wastes.
	Massachusetts Air Pollution Control Regulations 310 C.M.R. 7.00	Applicable	Regulations specific to control of odor and requirements for handling asbestos wastes and fugitive dust emissions.	Any odors and fugitive dust generated by O&M, redevelopment, and monitoring will be controlled. under these standards.
	Massachusetts Hazardous Waste Regulations 310 C.M.R. 30.00	Applicable	Regulations governing the generation, treatment, storage, and disposal of hazardous waste.	These regulations will be followed in conducting O&M, monitoring, and redevelopment activities. Potions of these regulations, which are specific to on-site PCBs are not applicable since PCB are adequately regulated under TSCA.
	Massachusetts Hazardous Waste Regulations 310 C.M.R. 30.125(b)	Applicable	Requirements for Toxic Characteristic Leaching Procedure (TCLP).	Wastes generated for off-site disposal in conducting O&M, monitoring, and redevelopment activities will be characterized and handled in accordance with these standards.
	Massachusetts Hazardous Waste Regulations 310 C.M.R. 30.302	Applicable	Requirements for any generator of a waste to determine if the waste is hazardous.	Wastes generated for off-site disposal in conducting O&M, monitoring, and redevelopment activities will be characterized and handled in accordance with these standards.

APPENDIX C
INTERVIEW NOTES

INTERVIEW DOCUMENTATION FORM

The following is a list of individual interviewed for this five-year review. See the attached contact record(s) for a detailed summary of the interviews.

Name	Title/Position	Organization	Date
Bill Eliot	Temp. Manager	Lappens	6/22/04
John Marcelonis	Sales	Direct Tire	6/22/04
Michelle Coffin	Curriculum Coordinator	Neponset Valley Child Care	6/22/04
Scott Webber	Manager	Lappens	6/30/04
Steve Costello	Norwood Town Planner	Town of Norwood	8/5/04
Dan Keefe	Project Manager	DEP	8/12/04
Jay Neparstak	Former Project Manager	DEP	8/12/04
Joe Laham	Site Owner	_____	8/18/04
Chris Turek	_____	US Army Corps of Enigneers	9/12/04

INTERVIEW RECORD

Site Name: Norwood PCBs		**EPA ID No.: MAD980670566**
Subject: 5 Year Review		**Time: 12:45** **Date: 6/22/04**
Type: _ Telephone Ξ Visit _ Other **Location of Visit:**		_ Incoming _ Outgoing

Contact Made By:

Name: Pernilla Lindblom	**Title: Environmental Scientist**	**Organization: Shaw E & I**

Individual Contacted:

Name: Bill Eliot	**Title: Temp. Manager**	**Organization: Lappens**
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address: 961 Providence Hwy** **City, State, Zip: Norwood, MA**	

Summary Of Conversation

Bill Eliot is just filling in for the Project Manager (Scott Webber) while he is on vacation.
Scott Webber will be back on Monday 6/28/04 and can be reached at 781-440-9992.
Bill Elliot Was not aware of any problems with the Norwood PCBs site and had no concerns.

INTERVIEW RECORD

Site Name: Norwood PCBs	**EPA ID No.: MAD980670566**	
Subject: 5 Year Review	**Time: 13:00**	**Date: 6/22/04**
Type: _ Telephone Ξ Visit _ Other **Location of Visit:**	_ Incoming _ Outgoing	

Contact Made By:

Name: Pernilla Lindblom	**Title: Environmental Scientist**	**Organization: Shaw E & I**

Individual Contacted:

Name: John Marcelonis	**Title: Sales**	**Organization: Direct Tire**
Telephone No: **Fax No:** **E-Mail Address:**	**Street Address: 981 Providence Turnpike** **City, State, Zip: Norwood, MA 02062**	

Summary Of Conversation

John was aware of the site and knew that there was remediation going on. He knew that digging was not allowed on the Norwood PCBs site. He did not have any questions or concerns.

INTERVIEW RECORD

Site Name: Norwood PCBs	**EPA ID No.: MAD980670566**	
Subject: 5 Year Review	**Time: 13:15**	**Date: 6/22/04**
Type: _ Telephone Ξ Visit _ Other **Location of Visit:**	_ Incoming _ Outgoing	

Contact Made By:

Name: Pernilla Lindblom	**Title: Environmental Scientist**	**Organization: Shaw E & I**

Individual Contacted:

Name: Michelle Coffin	**Title: Curriculum Coordinator**	**Organization: Neponset Valley Child Care**

Telephone No: 781-769-7720 **Fax No:** **E-Mail Address:**	**Street Address: 110 Kerry Place** **City, State, Zip: Norwood, MA**

Summary Of Conversation

The manager was not available at the time of the visit. Michelle was aware of the site and of remediation work there. She remembers a previous visit by someone concerning the site where they dropped off flyers about the proposed new development. She did not know of any problems and said that the site seemed secure.

INTERVIEW RECORD

Site Name: Norwood PCBs		**EPA ID No.: MAD980670566**
Subject: 5 Year Review		**Time: 12:45** **Date: 6/22/04**
Type: Ξ Telephone _ Visit _ Other **Location of Visit:**		_ Incoming Ξ Outgoing
Contact Made By:		
Name: Pernilla Lindblom	**Title: Environmental Scientist**	**Organization: Shaw E & I**
Individual Contacted:		
Name: Scott Webber	**Title: Manager**	**Organization: Lappens**
Telephone No: 781-440-9992 **Fax No:** **E-Mail Address:**	**Street Address: 961 Providence Hwy** **City, State, Zip: Norwood, MA**	

Summary Of Conversation

Scott was aware of ongoing sampling on the Norwood PCBs site. He was not aware of any problems on the site and had no concerns regarding the Site.

He had received a pamphlet regarding the possible development of a Lowes at the site, but was under the impression that it was not going to happen.

He does not feel well informed. He does not recall receiving any information (positive or negative) regarding the site in the 5 years he has been working at Lappens.

He had a question regarding a dumpster which is stored on the Norwood PCBs property behind his, which gets picked up and dropped off on a regular basis. He was wondering if someone rents this part of the property for this. He did not have a concern regarding this but was just curious. He was informed to contact the EPA or DEP contacts if a concern came up regarding this issue.

INTERVIEW RECORD

Site Name: Norwood PCBs		**EPA ID No.: MAD980670566**
Subject: 5 Year Review		**Time: 16:45** **Date: 8/5/04**
Type: Ξ Telephone _ Visit _ Other **Location of Visit:**		_ Incoming X Outgoing

Contact Made By:

Name: Pernilla Lindblom	**Title: Environmental Scientist**	**Organization: Shaw E & I**

Individual Contacted:

Name: Steve Costello	**Title: Norwood Town Planner**	**Organization: Town of Norwood**
Telephone No: 781-762-1240 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

6/30/04 10:15 – Steve is on vacation until 7/6/04. I left a message that I will be calling back.

8/5/04 4:45

Steve was not aware of any vandalism, trespassing, or emergency response issues at the Norwood PCBs Site.

He believes that the public would not have a problem with redevelopment as long as the cap was not disturbed. For example, the current use of the site as a car lot would be very acceptable.

Steve was worried about the fact that Lowes was not prepared for questions from the public. The Public does get involved with this site. The possible developers need to be prepared for questions regarding the environmental issues of redevelopment.

The only real issue he sees with the Site is that the developers need to work with the EPA as well as the Town in coming up with their plans for the site. He hopes that the next possible developer will attempt to work with the EPA first, and then involve the planning board.

INTERVIEW RECORD

Site Name: Norwood PCBs		**EPA ID No.: MAD980670566**
Subject: 5 Year Review		**Time: 13:30** **Date: 6/12/04**
Type: Ξ Telephone _ Visit _ Other **Location of Visit:**		_ Incoming X Outgoing
Contact Made By:		
Name: Pernilla Lindblom	**Title: Environmental Scientist**	**Organization: Shaw E & I**
Individual Contacted:		
Name: Dan Keefe & Jay Neparstak	**Title: current and former PM**	**Organization: Department of Environmental Protection**
Telephone No: 617-292-5940 **Fax No:** **E-Mail Address: Daniel.keefe@state.ma**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Dan Keefe and Jay Neparstak both believe the biggest issues at the site are that the remediation is not complete and an acceptable O&M plan has not been submitted.

DEP is responsible for taking over the O&M on fund-lead projects. Therefore the DEP would be responsible for O&M on the groundwater phase although none is expected since longterm groundwater treatment is not expected.

Groundwater treatment was stopped when most of the constituents had met groundwater cleanup goals and analyte concentrations were stable. TCB and PCB had not reached cleanup goals. RBALs were calculated to prove there would be no surface water impact at the current concentrations. The RBALs proved to be protective for TCB in groundwater but not PCB. A risk analysis was conducted and the report came out the end of July 04. This risk analysis concluded that PCBs were not a risk to Meadow Brook. This report is being discussed at a meeting on August 23rd.

An acceptable O&M plan for the rest of the site (excluding groundwater) has not been submitted yet.

Quarterly groundwater sampling was stopped partly due to contractual issues and partly because groundwater concentrations were stable.

The settling defendants still have to do sampling of some of the wells as part of their Environmental Monitoring Program they are supposed to have instituted.

Other loose ends: Institutional Controls have not been filed by the owner and the settling defendants.

They were not aware of any changes in regulations which may effect the protectiveness or the ARARs at the Site except for the change in groundwater classification form GW-1. Some groundwater clean up goals are being revised, however this should not impact the site since it is not GW-1.

INTERVIEW RECORD

Site Name: Norwood PCBs		**EPA ID No.: MAD980670566**
Subject: 5 Year Review		**Time: 10:00** **Date: 6/18/04**
Type: Ξ Telephone _ Visit _ Other **Location of Visit:**		X Incoming _ Outgoing
Contact Made By:		
Name: Pernilla Lindblom	**Title: Environmental Scientist**	**Organization: Shaw E & I**
Individual Contacted:		
Name: Joe Laham	**Title: Site Owner**	**Organization:**
Telephone No: 508-888-8200 X 223 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

8/17/04 Pernilla of Shaw left a message with Joe Laham

8/18/04 Joe Laham returned the call.

Joe Laham had several issues with the Site:

He wants to know when is the treatment plant building is being demolished? He was hoping that the building was being removed.

He believes that the EPA needs to be more proactive and cooperative in the development of the site. The Site was denied development by the Town due to traffic issues, size of building, and environmental issues. Joe believes that the EPA should have been more proactive in ensuring the town and the public that there are no longer any environmental issues at the Site. During public hearings regarding the development of the Site, environmental issues were brought up which concerned the public. He believes that the EPA should have been proactive in ensuring the public that there were no environmental issues with the development plan for the Site.

He did not know anything about whether or not Institutional Controls had been filed or were being filed.

INTERVIEW RECORD

Site Name: Norwood PCBs		**EPA ID No.: MAD980670566**
Subject: 5 Year Review		**Time: 9:00** **Date: 9/12/04**
Type: Ξ Telephone _ Visit _ Other **Location of Visit:**		_ Incoming Ξ Outgoing

Contact Made By:

Name: Eileen London	**Title: Environmental Scientist**	**Organization: Shaw E & I**

Individual Contacted:

Name: Chris Turek	**Title: Construction Manager**	**Organization: US Army Corp of Engineers**
Telephone No: 978/318-8234 **Fax No:** **E-Mail Address:**	**Street Address:** **City, State, Zip:**	

Summary Of Conversation

Chris believes that the construction went well and the plant operated well with just a few minor bugs, which were worked out. Operators were only required to check on it 3 days a week since the system was fully automated.

Construction is currently complete. No problems were encountered which impacted construction progress or implementability.

He speculated that if more monitoring wells had been installed or if they had been located differently, results may have tracked the plume more precisely, more definitive information may have been obtained, which would have made the treatment decisions more definitive.

APPENDIX D
PHOTOS DOCUMENTING SITE CONDITIONS

Photograph 1
Exterior of the Groundwater Treatment Facility from the cover area located west of the building.

Photograph 2
Interior of the Groundwater Treatment Facility.

Photograph 3
Treatment system discharge pipe.

Photograph 4
Detention Basin looking southeast toward Route 1.

Photograph 5
Detention Basin along north cover areas facing northwest.

Photograph 6
Gravel spilled into the Detention Basin.

Photograph 7
Vegetation growing in the spillway of the detention basin.

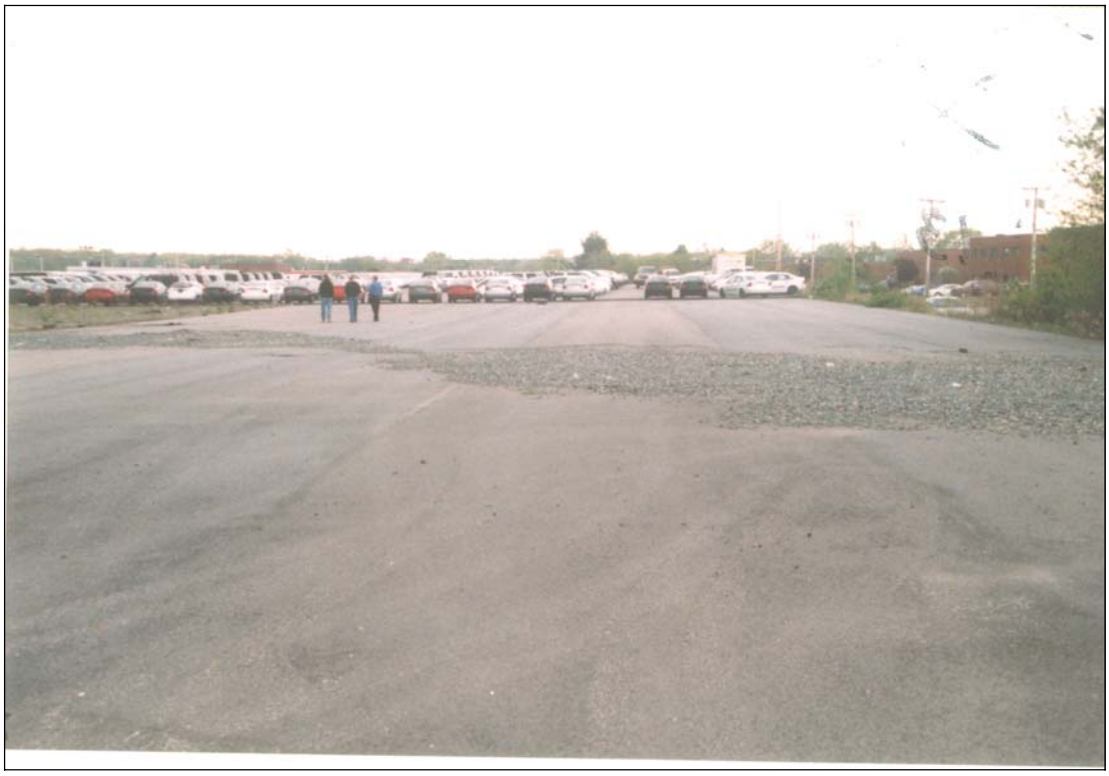
Photograph 8
Exposed geotextile and displaced riprap on side slopes of detention basin.

Photograph 9
Repaired riprap side slopes (second site visit).

Photograph 10
Vegetation growing in North cover area.

Photograph 11
Vegetation growing in South cover area.

Photograph 12
Crack in the paved cap area.



Photograph 13
Gravel spilled in the cap area.

Photograph 14
Gravel removed from the paved cap area (second visit) gravel pit, to the right of the cap area.

Photograph 15
Damaged Cape Cod berms.

Photograph 16
Repaired Cape cod berms noted at the (second site visit).

Photograph 17
Cape Cod berms still requiring repair (second site visit).

Photograph 18
Unlocked monitoring well.

Photograph 19
Meadow Brook adjacent to the site near discharge treatment system.

Photograph 20
Meadow Brook culvert under Route 1.

Photograph 21
Meadow Brook U-Channel east of Route 1.

Photograph 22
Meadow Brook east of Route 1.

APPENDIX E
FIVE-YEAR REVIEW SITE INSPECTION CHECKLIST

Please note that "O&M" is referred to throughout this checklist. At sites where Long-Term Response Actions are in progress, O&M activities may be referred to as "system operations" since these sites are not considered to be in the O&M phase while being remediated under the Superfund program.

Five-Year Review Site Inspection Checklist (Template)

I. SITE INFORMATION	
Site name: Norwood PCBs	**Date of inspection: 5/12/04 (& 9/7/04 return visit)**
Location and Region: Near Rt 1 & Dean St, Norwood, EPA Region 1	**EPA ID: MAD980670566**
Agency, office, or company leading the five-year review: EPA Region 1, Shaw Environmental	**Weather/temperature: Partly cloudy, ~70^{o}**

Remedy Includes: (Check all that apply)

Landfill cover/containment	Monitored natural attenuation
Access controls	Groundwater containment
Institutional controls	Vertical barrier walls
Groundwater pump and treatment	
Surface water collection and treatment	

Other groundwater treatment system is available, however is not currently in use ("temporarily shut down")

Attachments: Inspection team roster attached Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _____N/A_____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____
   _____

2. **O&M staff** _____N/A_____ _____ _____
   Name Title Date
   Interviewed at site at office by phone Phone no. _____
   Problems, suggestions; Report attached _____
   _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) See Appendix C for interview notes.

Agency Environmental Protection Agency
Contact Sharon Hayes _____ 5/12/04 (on site)
Name Title Date

Agency Environmental Protection Agency
Contact Bob Cianciarulo Massachusetts Superfund Section Chief 5/12/04 (on site)
Name Title Date

Agency Massachusetts Department of Environmental Protection
Contact Dan Keefe Project Manager 5/12/04 (on site)
Name Title Date
Also interview on the phone 9/12/04 along with Jay Neparstak, the former Project Manager at DEP.

Agency Army Corps of Engineers
Contact Chris Turek _____ 5/12/04 (on site)
Name Title Date
Also interviewed over the phone on 9/12/04

4. **Other interviews** See Appendix C for interview notes.

Joe Laham – Site Owner

Bill Eliot & Scott Webber – Lappens

John Marcelonis – Direct Tire

Michelle Coffin – Neponset Valley Child Care

Steve Costello – Town of Norwood

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**
   - O&M manual — Readily available — Up to date — N/A
   - As-built drawings — Readily available — Up to date — N/A
   - Maintenance logs — Readily available — Up to date — N/A

   Remarks_____

2. **Site-Specific Health and Safety Plan** — Readily available — Up to date — N/A
   - Contingency plan/emergency response plan — Readily available — Up to date — N/A

   Remarks This Plan is for O&M activities.

3. **O&M and OSHA Training Records** — Readily available — Up to date — N/A

   Remarks_____

4. **Permits and Service Agreements**
   - Air discharge permit — Readily available — Up to date — N/A
   - Effluent discharge — Readily available — Up to date — N/A
   - Waste disposal, POTW — Readily available — Up to date — N/A
   - Other permits_____ — Readily available — Up to date — N/A

   Remarks_____

5. **Gas Generation Records** — Readily available — Up to date — N/A

   Remarks_____

6. **Settlement Monument Records** — Readily available — Up to date — N/A

   Remarks_____

7. **Groundwater Monitoring Records** — Readily available — Up to date — N/A

   Remarks These records are kept in USACOE offices.

8. **Leachate Extraction Records** — Readily available — Up to date — N/A

   Remarks There are no leachate extraction records, however, there are groundwater extraction records and they are kept in the USACOE offices.

9. **Discharge Compliance Records**
   - Air — Readily available — Up to date — N/A
   - Water (effluent) — Readily available — Up to date — N/A

   Remarks These records are kept in USACOE offices.

10. **Daily Access/Security Logs** — Readily available — Up to date — N/A

    Remarks_____

IV. O&M COSTS – O&M

1. **O&M Organization**

State in-house Contractor for State
PRP in-house Contractor for PRP
Federal Facility in-house Contractor for Federal Facility
Other_____
_____

2. **O&M Cost Records**

Readily available Up to date
Funding mechanism/agreement in place
Original O&M cost estimate_____ Breakdown attached

Total annual cost by year for review period if available

From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost
From_____ To_____ _____ Breakdown attached
Date Date Total cost

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____
_____
_____
_____
_____
_____

V. ACCESS AND INSTITUTIONAL CONTROLS Applicable N/A

A. Fencing

1. **Fencing damaged** Location shown on site map Gates secured N/A

Remarks The site is not fenced

B. Other Access Restrictions

1. **Signs and other security measures** Location shown on site map N/A

Remarks Car dealers, which use the property for storage, block access to the lot overnight and have security during the day. Treatment building has a security system installed and remains closed and locked when unattended.

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented — Yes — No — N/A
Site conditions imply ICs not being fully enforced — Yes — No — N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date — Yes — No — N/A
Reports are verified by the lead agency — Yes — No — N/A

Specific requirements in deed or decision documents have been met — Yes — No — N/A
Violations have been reported — Yes — No — N/A
Other problems or suggestions: Report attached
Institutional controls include use restrictions, no groundwater withdrawal, no interference with response actions, disruption of caps, or excavation of contaminated material.

2. **Adequacy** ICs are adequate — ICs are inadequate — N/A
Remarks New ICs need to be published.
_____
_____

D. General

1. **Vandalism/trespassing** Location shown on site map — No vandalism evident
Remarks_____
_____

2. **Land use changes on site** N/A
Remarks A portion of the capped area is leased out for the storage of new cars by auto dealers. Cape Cod berms have been installed to keep possible discharge from vehicles in areas with storm drains installed.

3. **Land use changes off site** N/A
Remarks

VI. GENERAL SITE CONDITIONS

A. Roads Applicable — N/A

1. **Roads damaged** Location shown on site map — Roads adequate — N/A
Remarks_____
_____

B. Other Site Conditions

Remarks gravel from plowing has been plowed into the drainage ditch north of the site and onto the northwest corner of the landfill cap. The gravel is likely due to plowing. The gravel had been removed form the capped area prior to the second site visit. The current property occupant was required to install Cape Cod berms on the north and west side of the portion of the landfill cap that is used to park new cars. In several areas, these berms have been damaged or removed (likely due to plowing) and need to be replaced or repaired.

VII. LANDFILL COVERS Applicable N/A

A. Landfill Surface

1. **Settlement** (Low spots) Location shown on site map Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** Location shown on site map Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks Minor cracking noted in some spots at seams in the pavement.

3. **Erosion** Location shown on site map Erosion not evident
   Areal extent_____ Depth_____
   Remarks Erosion of rip rap into the drainage ditch has occurred in three locations along the northern edge of the north cover and cap area. Rip rap has eroded into the ditch and geotextile fabric is exposed. This issue had been fixed prior to the second visit but appears it may be a future problem if not checked.

4. **Holes** Location shown on site map Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** Grass Cover properly established No signs of stress
   Trees/Shrubs (indicate size and locations on a diagram)
   Remarks No vegetative cover used on the landfill areas However grass is growing in the gravel cover area which may be a future issue.

6. **Alternative Cover (armored rock, concrete, etc.)** N/A
   Remarks Most of the cap area is paved. Pavement is generally in good condition, Some minor cracking was noted along the seams.

7. **Bulges** Location shown on site map Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** Wet areas/water damage not evident
   Wet areas Location shown on site map Areal extent_____
   Ponding Location shown on site map Areal extent_____
   Seeps Location shown on site map Areal extent_____
   Soft subgrade Location shown on site map Areal extent_____
   Remarks_____

9. **Slope Instability** Slides Location shown on site map No evidence of slope instability
Areal extent_____
Remarks Three areas of rip rap slides were noted along the northern edge of the north cover area and the northern edge of the capped area. Rip rap has slid down into the site drainage ditch and geotextile fabric is exposed. This had been fixed at the second site visit, however appears it may be a future concern.

B. Benches Applicable N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** Location shown on site map N/A or okay
Remarks_____
_____

2. **Bench Breached** Location shown on site map N/A or okay
Remarks_____
_____

3. **Bench Overtopped** Location shown on site map N/A or okay
Remarks_____
_____

C. Letdown Channels Applicable N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** Location shown on site map No evidence of settlement
Areal extent_____ Depth_____
Remarks_____
_____

2. **Material Degradation** Location shown on site map No evidence of degradation
Material type_____ Areal extent_____
Remarks_____
_____

3. **Erosion** Location shown on site map No evidence of erosion
Areal extent_____ Depth_____
Remarks_____
_____

4. **Undercutting** Location shown on site map No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____
_____

5. **Obstructions** Type_____ No obstructions
Location shown on site map Areal extent_____
Size_____
Remarks_____
_____

6. **Excessive Vegetative Growth** Type_____
No evidence of excessive growth
Vegetation in channels does not obstruct flow
Location shown on site map Areal extent_____
Remarks_____
_____

D. Cover Penetrations Applicable N/A

1. **Gas Vents** Active Passive
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance
N/A
Remarks_____
_____

2. **Gas Monitoring Probes**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____
_____

3. **Monitoring Wells** (within surface area of landfill)
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks One groundwater monitoring well was noted to be missing a lock in the north cover area.

4. **Leachate Extraction Wells**
Properly secured/locked Functioning Routinely sampled Good condition
Evidence of leakage at penetration Needs Maintenance N/A
Remarks_____
_____

5. **Settlement Monuments** Located Routinely surveyed N/A
Remarks_____
_____

E. Gas Collection and Treatment Applicable N/A

1. **Gas Treatment Facilities**
Flaring Thermal destruction Collection for reuse
Good condition Needs Maintenance
Remarks_____
_____

2. **Gas Collection Wells, Manifolds and Piping**
Good condition Needs Maintenance
Remarks_____
_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
Good condition Needs Maintenance N/A
Remarks_____
_____

F. Cover Drainage Layer Applicable N/A

1. **Outlet Pipes Inspected** Functioning N/A
Remarks_____

2. **Outlet Rock Inspected** Functioning N/A
Remarks_____

G. Detention/Sedimentation Ponds Applicable N/A

A detention ditch is located along the northern edge of the property (south of Meadowbrook) and is used for surface water drainage from the parking lot stormdrains located in the cap area.

1. **Siltation** Areal extent_____ Depth_____ N/A
Siltation not evident
Remarks_____

2. **Erosion** Areal extent_____ Depth_____
Erosion not evident
Remarks Three areas of rip rap slides noted along the northern edge of the north cover area and the northern edge of the capped area. Riprap has slid down into the site drainage ditch and geofabric is exposed. This issue had been fixed prior to the second visit, however it appears this may be a future issue if not checked.

3. **Outlet Works** Functioning N/A
Remarks_____

4. **Dam** Functioning N/A
Remarks_____

5. **Vegetative Growth** Location shown on site map N/A
Vegetation does not impede flow
Areal extent_____ Type_____
Remarks There is no flow in the drainage ditch, however vegetative growth in the riprap spillway area is evident and may be problematic.

H. Retaining Walls Applicable N/A

1. **Deformations** Location shown on site map Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____

2. **Degradation** Location shown on site map Degradation not evident
Remarks_____

I. Perimeter Ditches/Off-Site Discharge Applicable N/A

Meadowbrook flows along the northern edge of the site and was part of the remediation project. When the groundwater treatment system is running it discharges to Meadowbrook.

1. **Siltation** Location shown on site map Siltation not evident
Areal extent_____ Depth_____
Remarks_____

2. **Vegetative Growth** Location shown on site map N/A
Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____
_____

3. **Erosion** Location shown on site map Erosion not evident
Areal extent_____ Depth_____
Remarks_____
_____

4. **Discharge Structure** Functioning N/A
Remarks There is a discharge pipe present from the groundwater treatment system, which is closed and not currently in use. It appeared to be in good condition.

VIII. VERTICAL BARRIER WALLS Applicable N/A

1. **Settlement** Location shown on site map Settlement not evident
Areal extent_____ Depth_____
Remarks_____
_____

2. **Performance Monitoring** Type of monitoring_____
Performance not monitored
Frequency_____ Evidence of breaching
Head differential_____
Remarks_____
_____

IX. GROUNDWATER/SURFACE WATER REMEDIES Applicable N/A

A. Groundwater Extraction Wells, Pumps, and Pipelines Applicable N/A

1. **Pumps, Wellhead Plumbing, and Electrical**
Good condition All required wells properly operating Needs Maintenance N/A
Remarks The groundwater treatment system is available but not currently in use.

2. **Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
Good condition Needs Maintenance
Remarks_____
_____

3. **Spare Parts and Equipment**
Readily available Good condition Requires upgrade Needs to be provided
Remarks_____
_____

B. Surface Water Collection Structures, Pumps, and Pipelines Applicable N/A

1. **Collection Structures, Pumps, and Electrical**
Good condition Needs Maintenance
Remarks_____
_____

2. **Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances**
Good condition Needs Maintenance
Remarks_____
_____

3. **Spare Parts and Equipment**
Readily available Good condition Requires upgrade Needs to be provided
Remarks_____
_____

C. Treatment System Applicable N/A Available but not currently in use

1. **Treatment Train** (Check components that apply)
Metals removal Oil/water separation Bioremediation
Air stripping Carbon adsorbers
Filters_____
Additive (*e.g.*, chelation agent, flocculent)_____
Others_____
Good condition Needs Maintenance
Sampling ports properly marked and functional
Sampling/maintenance log displayed and up to date
Equipment properly identified
Quantity of groundwater treated annually_____
Quantity of surface water treated annually_____
Remarks_____
_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
N/A Good condition Needs Maintenance
Remarks_____
_____

3. **Tanks, Vaults, Storage Vessels**
N/A Good condition Proper secondary containment Needs Maintenance
Remarks_____
_____

4. **Discharge Structure and Appurtenances**
N/A Good condition Needs Maintenance
Remarks The pipe in to the discharge structure to Meadow brook has been shut off.

5. **Treatment Building(s)**
N/A Good condition (esp. roof and doorways) Needs repair
Chemicals and equipment properly stored
Remarks Flashing on the roof of the building in the northwest corner is loose and needs repair.

6. **Monitoring Wells** (pump and treatment remedy)
Properly secured/locked Functioning Routinely sampled Good condition
All required wells located Needs Maintenance N/A
Remarks One monitoring well was found without a lock in the north cover area.

D. Monitoring Data The last montoring data was collected in October 2000 (27th round). Up until this time, data was reported as required.

1. Monitoring Data
Is routinely submitted on time Is of acceptable quality

2. Monitoring data suggests:
Groundwater plume is effectively contained Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   Properly secured/locked Functioning Routinely sampled Good condition
   All required wells located Needs Maintenance N/A
   Remarks_____
   _____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The purpose of the remedy is to protect human health and the environment. Based upon the site inspection, monitoring results, and observations during this review, the remedy appears to be functioning as intended. Although a definite, protectiveness determination cannot be made at this time until new clean up goals have been published and groundwater sampling has been conducted to verify that the new clean up goals have been met.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

The site is not currently in an O& M Phase. An O&M Plan has been prepared for Meadow Brook. This is the responsibility of the Town of Norwood although they have not performed any O&M to date. An acceptable O& M Plan for the cap and cover has not been submitted yet. The groundwater treatment system has been temporarily shut down due to changes in groundwater standards.

C.	**Early Indicators of Potential Remedy Problems**
	Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D.	**Opportunities for Optimization**
	Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.